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Text of Decision, Combustion Utilities Corporation vs. Worcester Gas Light Company.[1]

The defendant's Superintendent, Mr. Barnum, testifies to the necessity of a very carefully proportioned mixture of the products of combustion and of air, and to the practical improvement of heat regulation thereby. The testimony of this skilled and intelligent witness, however, as to the actual chemical reactions which occur in the defendant's producer, and the apparent divergence of expert opinion as to the chemical changes that occur during combustion, raise doubt whether the Doherty pateuts can be regarded as presenting either the correct chemical theory of operation of any novelty in the chemical changes above the grates.

To introduce carbon dioxid was not a new conception, and as it was well known, as conceded by complainant's expert, Mr. Queneau, that CO_2 reduced the temperature, we cannot concede that the conception of using carbon dioxid as a cooling agent is broadly new in the art.

It was doubtless familiar knowledge that carbon dioxid, a non-combustible gas, had chemically a cooling effect and not a temperature raising effect. It is urged by the complainant, however, that in the practice of the prior art it was introduced at so high a temperature as to offset any cooling effect from chemical reaction. Whether this is true with the Biederman & Harvey and Siemens' structures and process is not clear upon the patents themselves.

There is, it must be confessed, great force in the defendant's argument that, in the operation of any furnace, whether supplied with air alone or with air and the waste products of combustion, temperature regulation is implied, and that when in the prior art the products of combustion were supplied to the furnace they were necessarily accompanied by a regulated proportion of air; in other words, that there was necessarily a regulation of the respective amounts of air and carbon dioxid, in order to produce combustion and to generate carbon monoxid.

It is also apparent that in the operation of such furnaces the reduction of CO_2 to CO is endothermic or heat absorbing, and that whether the CO_2 was that resulting from combustion in the fuel bed, or that introduced in the draft current, the conversion of carbon dioxid to carbon monoxid was a cooling process.

It is fair to say that it is doubtful if the part of the specifications relating to the heat absorption in the reduction of carbon dioxid to carbon monoxid is anything more than the description of chemical reactions that have necessarily occurred with all types of gas producers, whether supplied with a draft of air alone or with both air and carbon dioxid.

That the improvement in the Doherty process consists merely in regulation of temperature through the reduction to CO of that portion of CO_2 introduced into the mixture seems impossible to realize as a fact. To single out as the actual and dominant factor in maintaining a low temperature the heat absorption which results from CO_2 introduced in the draft current, seems to give a fallacious emphasis to a part of what occurs above the grate.

That there is in a fuel bed operated with a Doherty regulator any novel chemical action is not established. The specifications were fairly criticized by the Examiner in this language:

"Applicant is not the inventor of any exothermic or exothermal or endothermic or endothermal reactions which may take place in the development or absorption of heat in his process. This is all theory, and the lengthy statements are unnecessary to a proper understanding of the present invention."

As is frequently the case, when a patentee attempts *ex post facto* a physical explanation of what he has found by experiment, a collateral issue is raised which diverts attention from what is more important, the means whereby he effects his result.

What we are concerned with is the difference between Doherty and what was done by prior inventors. This may be seen by examination of the apparatus, Patent No. 844,504, dated Feb. 19, 1907, for "Apparatus for Regulating Combustion in Furnaces." Claim 3 is as follows:

"In apparatus of the character described, the combination of a gas producer, a combustion chamber, retorts therein, secondary air flues leading to the combustion chamber, return flues for products of combustion leading from the combustion chamber to the stack and arranged in proximity to the secondary air flues leading underneath grate, an injector for conducting air and a portion of the products of combustion from the return flues to the grate, and means in addition to the injector for regulating the mixture of air and products of combustion."

The defendant contends that this claim is not for a true combination, but for a mere aggregation of devices; a gas producer and a retort bench, which do not co-operate to produce the result of regulating air combustion in furnaces.

1. This decision was partially noted in the JOURNAL for October 16, p. 253. The case has been appealed.

It is quite true that the gas producer should be considered by itself, and that references in the prior art are equally valuable whether the combustion chambers contain retorts or other articles to be subjected to heat. The retorts wherein is distilled illuminating gas from coal have no function in the production of the gas from the "gas producer." It may be said, however, that the claim is more limited in scope than the invention described. The type of furnace shown, including a gas producer, combustion chamber, retorts therein, secondary air flues leading to the combustion chamber, return flues for products of combustion, primary air flues leading to the combustion chamber, return flues for products of combustion, primary air flues leading under the grate, is well represented in the prior art, and the invention relates to improvements which in the specification it is said:

"May be applied either to the form of furnaces shown or to any other gas producing furnace, or they may be applied in connection with furnaces for steam boilers."

The fact that the element retort, referring to the retorts wherein illuminating gas is distilled from coal, is included in the claim, is an insufficient reason for pronouncing the claims invalid as for a mere aggregation. The entire structure of the claim comprehends new elements applied to a structure of an old type. If in this claim the inventor has, by including the words "retorts therein," limited himself to a claim for his invention when applied to use in a structure of special type, it would be a harsh and unusual construction of his claim to say that because he had unnecessarily limited himself to the use of his invention for the purpose of heating retorts, he should lose it altogether.

It is so generally the practice of patent solicitors to draw claims for an invention as applied to its most important use, and to file combination claims which cover the invention in a special field of application, that the doctrine of "aggregation" should not be applied to defeat this claim, merely because it includes a gas producer and a gas bench with retorts heated by the combustion of gas generated by the producer as well as Doherty's new regulating means, whereby the producer gas is generated more economically and thus the illuminating gas is more cheaply generated from the retorts.

The two elements of Claim 3 which require special consideration are:

"An injector for conducting air and operation of the products of combustion from the return flues to the grate," and,

"Means in addition to the injector for regulating the mixture of air and products of combustion."

Doherty shows in his drawings two forms of injectors and employs the word injector in the specifications to describe equally an injector nozzle supplied with air or steam from a suitable source, and an injector consisting of a power-driven fan. Though the defendant devotes a very considerable part of his brief to insistence that the patentee should be limited to the nozzle form of injector, and though a considerable amount of expert testimony is devoted to that question, I think to so limit it would be to do violence to the patent as issued; and I find nothing in the file wrapper which in my opinion amounts to a concession by the patentee that he had abandoned the fan injector so carefully described and illustrated. The fan type of injector is one used by the defendant, and the only one which will require consideration.

The fan injector by its motion sucks in the waste gases and also a portion of air which is regulated by a damper. The complaint contends that, in view of the prior art nozzle injectors and fan injectors were well-known equivalents, and this seems to me clear. They were both used for producing motion of the waste products of combustion toward the grate.

The ordinary injector of the prior art was a means of conducting the products of combustion, and incidentally perhaps air, to the grate. In the prior art also there were means in addition to the injector for regulating the amount of air introduced with the products of combustion. The British patent to Siemens, No. 16,207, which was cited against the patentee in the patent office, has an injector shown by reference to character K, and means in addition to the injector for introducing more or less air in conjunction with the waste products of combustion are shown in a jet K, and in doors, M, M' and J.

Letters Patent No. 468,834, to Siemens, February 16, 1892, disclosed a similar means in addition to the injector. The Biederman & Harvey patents, numbered 442,600 and 451,612, disclose an injector for producing à movement of the waste products of combustion toward the grates, and also show means for introducing under the fuel beds more or less air. It is fundamental in a device of this character that more or less air be fed to the grates or to the fuel beds, and it is evident that devices of the injector type for propelling to the grates the waste products of combustion would result in some mixing of the products of combustion and air, but the regulating means are rough compared with Doherty's means for close regulation, and indicate no knowledge of the value of more exact regulation.

It must be conceded that the prior art comes very close to the Doherty patent in respect to the general features of operating gas producers. By analysis of the structures of the prior art it is possible to point out one by-one elements corresponding to the terms wherein the patentee in his claims has set forth his invention. Nevertheless these elements are not combined in any structure of the prior art as Doherty has combined them in his apparatus.

While the prior art has injectors, and has means other than the injector for introducing air, they are not in the same relation and are not so arranged as to co-operate, as in the Doherty apparatus for the close regulation of the proportions of the mixture. The importance of this is conceded by Mr. Barnum, defendant's superintendent, who says that he has always operated defendant's structure with the gases thoroughly mixed and diffused.

In this and in the special manner in which the injector and dampers are conjointly used the defendant's follows Doherty and not the structures of the prior art.

The defendant's fan injector is accurately described in the language of claim 3, as an injector for conducting air and a portion of the products of combustion to the grate, and it co-operates both with the damper for the admission of air and with the return flues, exactly as the fan injector of the Doherty apparatus patent.

Whether the capacity of the defendant's producer to operate without the promotion of clinkers is due entirely to the adoption of what was taught by Doherty we need not determine. It is enough that this is of substantial value in assisting to the result. If the use of shaking grates to automatically remove the ash before it is fused to slag is the efficient means of preventing clinkering, the defendant is at liberty to enjoy this means alone, without infringing the Doherty patents. If it be said that in mixing his waste products and air more thoroughly, and in introducing the mixture cooler, Doherty merely differed in degree from the practice of the prior art, yet this is a difference which is more than a mere difference in degree, and is brought into the field of invention and of patentability by showing novel and valuable results. "Diamond Rubber Co. *v.* Consolidated Rubber Co. (supra).

Though it may have been well-known that slag is produced only at a high temperature, and can be avoided by a low temperature, apparently it was not known in the practical art how to approach the maximum temperature desirable in gas producers without overstepping the line at which slagging is caused.

A very protracted and careful examination of the record convinces me that Doherty made a meritorious advance in the art; that he was the inventor both of an apparatus and a new process. While there is much ground for discussion in that part of his specification which relates to the theory of operation, and in his claims, yet it seems reasonably free from doubt that Doherty's apparatus for regulating combustion was a new structure which is not anticipated in the prior art, and that it embodies the discovery that by a definite control of the mixture of air and waste products of combustion, and by a definite regulation of the temperature of his mixture, he could accomplish a valuable result which could not be accomplished and had not been accomplished. Merely by using the waste products of combustion and air without regard to their exact proportions, the thoroughness of mixture and the temperature at which the mixture should be introduced. Exact adjustment of these as means to the specific and novel end of maintaining temperature within a maximum limit, for the elimination of the undesirable slag which accompanies the use of the same means not exactly adjusted, and applied without regard to and without attaining this specific improvement, distinguishes Doherty broadly from the prior art.

While the general resemblance of the means of generating producer gas brings the prior art close to Doherty, yet in the specific features of successfully eliminating the formation of slag while operating a gas producer, which is the subject of his invention, there is, so far as the patents in evidence are concerned, no prior disclosure and no prior art with means which resemble Doherty's.

The defense of non-infringement before the filing of the bill, based upon the fact that the plant was operated for about 2 months by the Riter-Conley Mfg. Co., is, in my opinion, without merit. This operation was conducted in accordance with a contract whereby the de-

fendant procured the Riter-Conley Company to construct the plant and to operate it for the purposes of defendant's business. Under such circumstances the defendant is responsible for the infringement.

To consider in detail the criticisms of the claims would uselessly prolong this opinion. Each claim of the process patent is expressly limited by the expression, "The hereinbefore described process," and when read in connection with the specification, is intelligible, though claims 10 and 13, of the process are not clearly expressed.

I find claims 7, 10 and 13 of the Process Patent, No. 829,105 valid and infringed,

I find claim 3 of the Apparatus Patent, No. 844,504 valid and infringed.

A draft decree may be presented accordingly.

OPINION ON DEFENDANT'S PETITION FOR REHEARING AND TO REOPEN THE CASE.

BROWN, J.—After filing an opinion in favor of the complainant, the defendant files a petition asking that the case be re-opened in order that it may be permitted to introduce in evidence Letters Patent to Ellis, No. 790,253; and also for reconsideration of the case in view of proceedings in interference between Doherty, the inventor of the patents in suit and Ellis, wherein it is claimed that certain concessions of priority were made by Doherty to Ellis. The discovery, after final hearing and decision, of another United States patent and particularly the discovery of a patent referred to in defendant's record, and specifically referred to in defendant's brief, is not, under the circumstances, a sufficient justification for reopening the case. [Here follows the citing of 4 separate cases bearing on the matter at issue.]

Further, the Ellis patent was granted in pursuance of an application of later date than the first Doherty patent, and as the Doherty inventions are so closely related (see Steinmetz *v.* Allen, 192 U. S., 543, 559, 561), Ellis, upon the showing made by the petition, is later than Doherty. The petition does not indicate that a different result should have followed, if the Ellis patent had been before the Court at the final hearing. The concessions of Doherty to Ellis and of Ellis to Doherty for the purposes of an interference were upon the record in an exhibit offered by the defendant. It is doubtful if these concessions, made for the purposes of an interference, can create an estoppel upon Doherty as against a defendant who is not in privity with Ellis. As admissions, they have little force, in view of the concessions made by Ellis to Doherty and of the claims allowed to Doherty in interference. The argument that the concessions of Doherty to Ellis are destructive of Ellis' claims to priority seems equally applicable to show the destruction of Ellis' claims to priority by his concessions to Doherty. It is a question whether the mutual concessions are not so inconsistent as to neutralize each other. However that may be, the defendant does not make a case which justifies the reopening and continuance of this already protracted litigation. The defendant has chosen the grounds upon which to contest the Doherty patent. This choice has shaped the course of the testimony, and the rule that the party who has his day in court must present his case, and not reserve arguments, then fully available, for use in case he shall not prevail upon his chosen defenses, seems specially applicable to the present position. Petition denied.

[September 21, 1911, Messrs. Macleod, Culver, Copeland and Dike, with Mr. Jno. H. Roney, Attorneys for Appellant, took issue with the opinion, and prayed for an appeal to the U. S. Circuit Court of Appeals (First Circuit), which appeal was allowed by Judge Arthur L. Brown. The assignments by Counsel of errors in the initial trials are here appended.—EDS.]

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1. The Court erred in not dismissing the bill of complaint.

2. * * *[1] In finding that Henry Latham Doherty was the first, original and true inventor of the inventions and improvements described in Letters Patent No. 829,105 and No. 844,504, in suit and each of them.

3. * * * In entering a decree holding that the Letters Patent No. 829,105 and No. 844,504, and each of them, are good and valid in law.

4. * * * That claim 3 of Letters Patent No. 844,504, and claims 7, 10 and 13 of Letters Patent No. 829,105 in suit, are good and valid in law.

5. * * * That defendant's apparatus or structure infringed claim 3 of Letters Patent No. 844,504 in suit.

6. * * * In holding that defendant infringed upon claims 7, 10 and 13 of Letters Patent No. 829,105 in suit.

7. * * * In not finding that claim 3 of Letters Patent No. 844,504 in suit was an aggregation and not a combination of co-relating and co-acting elements.

8. * * * Not finding that claims 7, 10 and 13 of Letters Patent No. 829,105 in suit were not processes within the meaning of the law, but were merely a recitation of results of chemical processes, long well known in the art prior to the Letters Patent in suit.

9. * * * In finding as a fact that the alleged process obviated the production of cllnkers and the saving of fuel.

10. * * * In not finding that claims 7, 10 and 13 of Letters Patent No. 829,105 in suit are and each of them is indefinite and ambiguous.

11. * * * In holding that the tests testified to by defendant's expert embodied knowledge not known generally to the art, in view of the fact that it was well known that the introduction of carbon dioxid (CO_2) lowered the temperature of combustion.

12. * * * In holding that Letters Patent No. 829,105 in suit specified and directed a careful mixing of air and carbon dioxid in carefully determined proportions and the introduction of this mixture at a moderate temperature.

13. * * * In holding that claims 7, 10 and 13 of Letters Patent No. 829,105 in suit specified, directed and embodied a careful mixing of air and carbon dioxid in carefully determined proportions and the introduction of this mixture at a moderate temperature.

14. * * * That it was novel and patentable to carefully mix air and carbon dioxid in determined proportions and to introduce the mixture produced at a moderate temperature.

15. * * * In not finding that claims 7, 10 and 13 of Letters Patent No. 829,105 in suit called for and included as an essential element the dissociation of the introduced carbon dioxid as a means to regulate and control the temperature within the furnace.

16. The court erred in finding of fact:

"Finding as we must upon this record that the effect of operating a gas producer by such a mixture resulted in the maintenance of an even temperature below the clinkering point."

17. * * * In misconceiving the invention of Doherty, as set forth in the process, Patent No. 829,105 in suit, when it found that Doherty invented a mixture of carbon dioxid and air, carefully proportioned and introduced at a moderate temperature.

18. * * * In holding that the defendant was restricted to carbon dioxid in a mixture of carbon dioxid and air at a temperature sufficient to restore heat.

19. * * * In not finding that it was old at the date of application for the Doherty patent, No. 829,105 in suit, to introduce air and carbon dioxid in carefully determined proportions and at a moderate temperature.

20. * * * In finding that the injector of complainant's patent, No. 844,504 in suit, is the equivalent of defendant's fan blower as a means of carefully regulating the proportion of carbon dioxid and air introduced in the furnace.

21. * * * In not finding that the proceedings in the Patent Office limited 3 of Letters Patent No. 844,504 to an injector capable of in itself introducing air and excluded from the scope thereof the fan blower of defendant's construction.

22. * * * In finding that the structure of Letters Patent No. 844,504 in suit was capable of conjoint use with the process set forth and described in Letters Patent, No. 829,105 in suit.

23. * * * In not holding that claim 3 of Letters Patent No. 844,504 in suit, and claims 7, 10 and 13 of Letters Patent in suit were void for want of novelty or patentable subject matter.

24. * * * In not finding that the complainants failed to prove an act of infringement by the defendant appellant of the patents in suit before the filing of the bill of complaint herein.

25. * * * In holding that the complainants were entitled to recover any costs herein from the defendant.

26. * * * In holding that a perpetual injunction be issued in this cause against the defendant, its officers, agents, servants or employees, enjoining and restraining it and them from making and using the structure operated by the defendant.

27. * * * In appointing, as it does in the sixth paragraph of the decree a special master to take an accounting of the gains, profits and advantages which accrued to the defendant, and the damages suffered by the complainants on account of the said infringement.

28. * * * In dismissing defendant's petition for a rehearing. Wherefore the defendant appellant prays that the said decree be reversed and that the said court may be directed to dismiss the bill of complaint.

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1. * * * The Court Erred.

The Lighting of Court House Square, Scranton, Pa.

Through the attention of Mr. E. M. Stack, General Superintendent of the Scranton (Pa.) Gas and Water Company, we are enabled to herewith relate some particulars respecting an impressive use of gas for illuminating the Court House Square.

When the Commissioners of Lackawanna County, some months ago, invited competitive tenders for the decorative and commonplace illumination of Court House Square, Scranton, responses were made thereto which enabled the Commissioners to really institute comparisons on all accounts that caused competition pure and simple, as between gas currents and electric ones.

The proprietors of the Scranton Gas and Water Company outbid the Electric Company, candle power for candle power, with a more massive and artistic lamp and pillar installation and equipment, so the contract (to run for 5 years) went to the former.

The gas equipment now installed on the beautiful green, and the well-shaded square situated in the central part of the city is one of the most elegant and artistic illuminating equipments ever installed in Northeastern Pennsylvania, perhaps east of the Mississippi river, so writes our special commissioner. The lamp columns are fluted copper shafts, balanced on a massive Grecian iron base with a spring door at the base of shaft whereby the lamps can be lighted and extinguished at will. The head of this column is cross-armed with a Grecian design, gripping a fountain of 5 massive amber glass balls. Each ball is 14 inches in diameter, making a total installation of 260 highly illuminated and decorative lighting installations as shown herewith.

Fig. 1.—Lighting Court House Square, Scranton, Pa.

The lamps have been placed on exhibition in close proximity to an electric equipment of good character and have demonstrated beyond all question to the merchants and citizens of Scranton the superiority over electricity, of gas, in point of economy, brilliancy, candle power.

Fig. 2.—Lighting Court House Square, Scranton, Pa.

color and maintenance. It has demonstrated throughout the city its superiority to any other artistic lighting ever installed in the city, and the County Commissioners deserve full and generous credit that the general public is bestowing upon them in the selection of the gas lights and their distribution around Court House Square, and the main one to whom credit should be given for this exemplication of public lighting of modern type, is Manager Stack.

Fig. 3.—Lighting Court House Square, Scranton, Pa.

Fig. 4.—Lighting Court House Square, Scranton, Pa.

Much discussion is now agitating the business men and leading citizens of this and other cities regarding the proper illumination and decoration of the business thoroughfares, and the shaded and residential sections of up to-date cities, and to these perhaps a specific reference to the modern and brilliantly decorated Court House Square in Scranton, with its copper shaft, 5-ball, gas lamp equipment, might emphasize the desirability from an illuminating and decorative standpoint in other cities, especially so when their betterment of civic conditions can be secured at a cost well under that of a well tried out, well maintained system of electric lighting. The figures will help explain the story.

The examples shown are 5-light clusters, consuming about 3½ cubic feet of gas per lamp, which, at the rates charged for gas in Scranton, gives a magnificent lighting effect at a cost of 2.96 cents per hour for the gas taken by each cluster. The exhibition so far has been so attractive that many of the leading storekeepers, hotel proprietors and other semi-public business men are keeping the Scranton Company's people busy in filling the orders that come to them simply through the advertisement above noted.

[Continued from Page 326.]

PROCEEDINGS, SEVENTH ANNUAL CONVENTION, NATIONAL COMMERCIAL GAS ASSOCIATION.

Held in Denver, Col., October 24 to 28, 1911.

First Day—Afternoon Session.

The Secretary, at the suggestion of the President,

Read Letters and Telegrams,

expressing the regret of the writers at their inability to be in attendance at the meeting. The Secretary also read letters and telegrams inviting the Association to hold its next meeting in Atlanta, Ga., the writers including Hon. Hoke Smith, Governor of Georgia; F. J. Paxon and W. J. Cooper, Board of Trade, Atlanta; from the Mayor and Common Council, by formal official invitations; R. C. Congdon, Manager, Atlanta Gas Company; the "Ad. Men's Club;" Federation of Trades. Also an invitation from the Elks Club (Denver), to enjoy its hospitality.

The President introduced Mr. E. L. Elliott (New York), Editor "Illuminating Engineer," who read his paper on

ILLUMINATING ENGINEERING AND ITS APPLICATION TO THE GAS INDUSTRY.

[For the text of the paper, see *ante*, p. 305.]

Discussion.

The President announced that discussion on the paper would be in order. He hoped it would be free and full.

Mr. J. P. Hanlan said he was a gas man who believed in illuminating engineering because it was a help towards advancing gas lighting as it should be advanced. They made in Newark, N. J., in the past year a number of installations that probably would not have been quite as successfully made were it not for the application to them of the principles of illuminating engineering. Their corporation owned and operated the Public Service Electric Company, which was very keen for business. In fact, each division tried keenly to expand its business, and both aimed to give the consumer the very best light possible. Each aimed to give its consumers a complete installation so that each could actually stand on its merits. In the past 6 weeks they made a strictly gas installation in a Jersey City church, which opportunity came to them because they furnished equal illumination for less cost than could be given by the electric division. The church was lighted from modern gas fixtures. The Y. M. C. A. new bowling alleys in Jersey City were being lighted by gas, and they had a strong letter of recommendation for the installation. About 18 months back they induced the school board in a certain town to spend over $1,000 on a gas installation, that to-day stands a monument to the salesman who secured the order. Mr. Hanlan thought the gas salesman had a good chance to get store lighting. In fact, if gas salesmen tried salesmanship plus illuminating engineering, they could get plenty of new business. As an illustration. Happening to be visiting a progressive suburban town he said to their representatives, "How about that new department store over there?" The reply was, "I am shut out; they are going to use electricity entirely." Well, their illuminating engineer got up a plan, armed with which our representative finally induced the owner to spend $260 on installing gas to the first and second floors. Their footing now was equal to that of the electric company, which was as it should be. Recently his Company got a letter (to be used in connection with the lighting competition in "Progressive Age") from a Newark florist, and the representative who planned it, although not an illuminating engineer, nevertheless, instinctively applied the principles of that art. The letter noted: "I have one of the best lighted stores in my section of the city, and my bill, I am glad to say, has never been excessive." A proper installation will not only get the business but will hold it. The consumer pays his bills without dickering or trouble. Of course, a gas man was not alone in the field of gas lighting devices, for many peddlers and hucksters sold inferior, and in this instance the electric man was not bothered. However, they had to fight all the harder for gas lighting, and he believed the field for gas lighting was still open to them on a very favorable basis, even through contest.

Mr. Blyler took issue with any statement asserting that gas was a back number. The considering of illuminating engineering or artificial illumination was simply a means of making it possible to see in the dark. The function of artificial light, with the application of the sort of light used, depended greatly on the color value, economy and other things going with it. In many places they were absolutely alone in advancing their business, because they usually called in an engineer to design the plumbing and electric wiring, etc., but in the case of large buildings the gas piping was often left out. Getting around to the purchase of fixtures, Mr. Elliott claimed the aesthetic feature enters into the transaction, the fixture man only having had ornamental fixtures suggested to him; such were all he had to show to his customer. They did not go to the architect or engineer at first, but visited the man who was going actually to pay the construction bills. Out of all the large buildings constructed, except those where it is a sure thing their own plant is to be installed, they were putting in gas pipes, and it was done by putting the proposition up to those who were to occupy the places as business propositions. For example: The William French Company was a concern that supplied furnishings for very fine houses (in fact, the Company was now furnishing a house in St. Paul at a cost for furnishings equaling $80,000), and the speaker went to St. Paul to see the owner about the matter. The architect had advised him not to pipe for gas a new 5-story building he was erecting in Minneapolis. It was quite a while (in fact the building was virtually constructed) before he met Mr. French, and they reasoned it out. In ½ hour, through having convinced him that, whether he took electric service from a separate company or whether he installed the isolated plant, being piped for gas would insure him light in case of interruption to the electric service, he asked that the building be piped. Being told it would be a difficult task to do this because the construction was completed, he came to Minneapolis with his architect and they visited a number of places where gas and electric light was used. In one store they saw an installation of 21 tungsten lamps and 12 reflexolier gas burners, the effect of which on him was marked. We looked over the installation, lamp by lamp. Finally he asked the architect, "Which light is the better?" and the architect replied, "Why, gas is." They examined goods under the two lights and gas gave the better color value. Next he asked, "Which is the cheaper?" The architect replied, "Gas." Then he asked, "Why don't you pipe my building?" The architect replied, "I don't like those fixtures." There was the kernel. The speaker then said: "Mr. Kenyon" (the architect) "If you should put up a 10 story building next to that 5-story one, covered with ornamentation, and could rent the former for half the money asked for the 5-story one, which would Mr. French take?" "The 10-story one, of course." "Enough said," was the verdict, and Mr. French determined to pipe the building and light three of the floors with gas. Again, as to an 8-story building. His Company proposed to light the basement and ½ of the first and second floors with gas according to the Gas Company's plan. Then the Electric Company was to be invited to light the other halves and, putting both systems on meters, to get a demonstration as to the relative value of gas and electric light prior to final choosing. We also proposed, in case he wished to put in an individual electric lighting plant, to run it on a cheaper basis than he could hire a man to run it, to say nothing about a several thousand dollar investment, without reckoning depreciation at 10 per cent. of cost, as well as the costs of fuel, engineers, electricians, etc. Now, the cost per month for lighting that building, with over 700 inverted lamps, ranges from $60 to $120 a month. They used those arguments to get every building piped, and referred parties putting up new buildings to those who have followed their advice in connection with older structures. The main thing with which they had to contend was the design of gas fixtures and failure to have intelligent application made of gas for lighting use.

Mr. Barrows asked Mr. Elliott if he could tell whether the 8th city (about 90,000 residents in his table, where gas was used in mantle burners only) was supplied with natural gas or manufactured gas?

Mr. Elliott—Manufactured gas.

Mr. Barrows said a point suggested was the citation of examples of buildings properly illuminated or in which the principles of illuminating engineering had been applied. He would hint to the Editor of the "Bulletin," the possibility of abstracting from the discussions of the Illuminating Engineering Society articles giving concrete examples. The transactions of the Illuminating Engineering Society were very largely technical, yet recently a number of concrete examples and illustrated papers, showing the illumination of buildings, might carry to many of them ideas which could be applied in the illumination of similar buildings. [Applause.]

A Member regretted that the time for discussion was so short. However, he was only too glad that the possible time had been taken

up so well by the representatives of operating companies. Three things he would refer to especially. First, the paper stated that the use of gas lighting would continue only so long as it was cheaper in actual running cost. He undoubtedly thought this referred to the present state of public sentiment, and was probably made on the assumption that the gas interests would have to adopt aggressive methods to cause the public to recognize the superiority of gas lighting; but he thought it too early to admit such an assumption was justified. Indications pointed to early action in promoting publicity along the lines of gas use, and if that publicity referred to gas lighting, drawing special attention to its great superiority from a hygienic standpoint, and its physical effect upon the vision, he did not think it unreasonable to believe that the time would come when gas lighting would be preferred on an even basis of cost. The progress made in respect of gas lighting apparatus and design of fixtures was very great indeed, and as it was just such conveniences that had really made electric lighting, he saw no reason why they should not produce practically the same results in the field of gas lighting. In looking over the table he noticed a number of companies reporting for successive years decreases in their proportion of gas lighting business, which was a very unsatisfactory state of affairs for the gas business in general. It was undoubtedly due to the opinion that fuel gas business was further removed from electric competition than the gas lighting business. It was generally conceded that lighting by means of 10-cent electricity costs about 2½ times more than if the lighting were done by $1 gas. He had no figures as to relative efficiency of gas and electricity for fuel, but had heard the statement made, based upon tests by thoroughly impartial and conservative engineers, that electricity at 2½ cents could compete with gas at $1 for domestic fuel purposes. On that basis the relative position, as competitors, between gas and electricity, would be about even with 10-cent electricity and $1 gas for illumination, and 5-cent electricity and $1 gas on fuel account. In a great many places 10-cent electricity prevailed for lighting, while for domestic fuel purposes, during the off peak period, it might be sold for 5 cents. It seemed that gas lighting appliances which could be instantly operated by push-button control—and there was a very strong chance that such appliances would be soon forthcoming—and artistic features, results could be obtained equal to any in the use of electric light. It was possible to manufacture fixtures in which it would be impossible to tell whether the unit was from gas or electricity. It looked that, if the gas man felt doubtful of his reputation, even with a differential of 250 per cent. in his favor, he was certainly running out of scrapping qualities. He would not admit that for himself or for his fellow members either. They should remember, regarding the influence of the electricity on the development of the gas business, that electricity, being a product which could not be stored, required a uniform demand for its most economical production. As lighting was essentially a non-uniform demand, most electric plants must provide 3 times as much current during the load as during the rest of the day, and as two-thirds of their machinery was idle during the greater part of the day, they could and did make extremely low rates for current for industrial and domestic purposes during the off peak period. In some places it was low enough to compete with gas for cooking, within the the limit of 250 per cent. Consider a plant of this sort in a town where two-thirds of the lighting was done by gas. Suppose the gas companies relinquished the lighting business to the electricians, and the maximum demands of the electric company, after taking over the gas lighting business, were found to be 9 times as much as during other hours of the day. If they desired economical plant operation, it would be necessary to get 3 times as much lighting, heating and cooking, as by electricity and give 3 times the inducement in the way of price to get it. If the gas man relinquished the lighting business, he would find he had simply sewed himself up in a sack. Having given away his lighting business he compelled the electric company to take over a portion of his fuel and industrial business by reason of the fact that the electric company would have to obtain that business to keep the load factor of the plant in satisfactory condition. [Applause.]

Mr. Ewing said it seemed too bad that a paper of this sort should have a great big sheet of statistics coming from so few companies. He did not believe this at all represented the gas interests of this country. He thought it came from an electrical source, and he did not believe any one gas man present was willing to admit the statements made. He was not willing to give to the electric light company all that he asked them to give up, and when he said this was a representative report, he did not know what he was talking about. The speaker would like to have him visit Detroit to see some real good gas lighting. They should not let the bugaboo of electricity scare them out, and he thought they could well afford to take more than 10 minutes time in the discussion, for he would like to hear from some of these good gas men.

Mr. Wrightington thought possibly Mr. Elliott's idea in writing the paper, and the tone in which it was composed, were to appeal to them to go after the gas lighting business in an intelligent way instead of a haphazard one, like that followed in the past. If such were the case—and he thought it was—the paper may not have been written in vain. Mr. Ewing did not admit a number of statements made by Mr. Elliott, but let that be as it might they could take home the truth told that they must study the gas business scientifically, from a gas lighting standpoint, then the paper is well worth while.

The President said the paper by Mr. Blinks, which was down for Thursday afternoon, was somewhat along this line, so he thought it would be better to now ask Mr. Elliott to close the discussion, in that an opportunity to debate along similar lines would occur later.

Mr. Elliott was sorry the discussion could not go on. The attitude of the last speaker was beginning to get at its very merit. He did not think, however, it was intended to be intimated that the writer of the paper was electrical in his sympathies. He was the most enthusiastic gas lighting man in this country that he had ever met. In proof whereof he would refer to next the last column in Table 6, from the top, where it was asked for a general opinion of the future outcome of gas lighting, and listen to what this man said (and he is a gas man): "Gas is rapidly being replaced by electricity;" now that is the gas man's own man. He had talked with many and various of them to get a *sub rosa* opinion between, and their enthusiasm on gas lighting was not anywhere like as great as that shown in that table. If there were an indictment that he would bring against the gas interests in the way of gas lighting it was that they had cold feet on their own proposition. As to gas lighting being routed out of first class buildings, he had tried for the last 5 years, during which time he had been in the publishing business, to get some real good gas installations to illustrate in his "Magazine," something that would show up well with the electrical examples. How many of them had they seen there? He tried his best to get one for this convention issue, and wished to show one on the front cover, if he could. He at least wanted to have some good gas installations written up. He hunted all over New York and finally found a dairy restaurant on 42d street as the best example. Would they name him a first-class building in New York city lighted with gas? Could they name him a first-class one in Philadelphia so lighted with gas; or an office building, hotel, theater or big department store? Were there any? He had never seen them. They should not let enthusiasm run away with the plain out facts. It was a splendid thing to be enthusiastic and as he said, his indictment against the gas interests was that they are not enthusiastic by one-half—not as much as the speaker was; but the facts were there. They could not name a building lighted by electricity to become lighted with gas by mere say-so.

Mr. O'Donnell said, one of the largest auditoriums in the country (Academy of Music, Broad and Locust, Philadelphia) was lighted with over 500 reflex lights.

Mr. Elliott asked how long ago was that building constructed?

Mr. O'Donnell replied, some 65 years. The latter further said: One of the largest department stores in this country probably in the world (Gimbel Brothers, at 9th and Market, Philadelphia) was lighted with over 300 arc lights. [Applause.)

Mr. Elliott said it was his opinion that only the older buildings were piped. New ones were not being so piped; at any rate this proportion was extremely small. He did not know a single one in New York city, nor did he know of one in Philadelphia, nor in any other city that he ever visited, and there was a sentimental notion in the country that electricity was first-class while gas was not. Did anyone ever see a railroad advertise[1] that its cars were gas-lighted; yet gas was the best type of illumination for railroad cars.

Mr. Blyler called attention to the fact that about a dozen new buildings in Minneapolis were piped.

Mr. Elliott remarked he was sorry to say Minneapolis was one of the cities he had not visited.

Mr. Norcross asked Mr. Elliott to look at the new Public Library in New Haven, one of the finest pieces of architecture anywhere in our part of the country, and it was all lighted by gas.

Mr. Blyler said the Public Library in Minneapolis, and about 12 sub-stations, were all lighted with gas.

1. D., L. & W., for one. (Eds.)

Mr. Hanlan noted that one of the finest buildings in Hackensack, N. J. (Levy's Department Store) had both gas lighting and electric lighting. In Orange, N. J., there were two new department stores jointly lighted with gas and electricity.

Mr. Schmetz reported that the Post Office in Detroit, the capacity of which was recently increased by 50 per cent., was entirely lighted by means of gas burners of the reflex and arc types lamps.

Mr. J. R. Hare said Mr. Elliott spoke only of new buildings, but would he take into consideration new buildings and also buildings where they had replaced electric lighting with modern gas lighting? If he would admit that they could show him very many installations in Philadelphia.

Mr. Perkins said Reading was only about 58 miles from Philadelphia, and there they had a factory which formerly generated its own current. His Company told them to shut down the plant and the Gas Company would take up the task, and the Gas Company got it.

Mr. Elliott said he was glad to hear of these comparatively isolated cases. [Laughter.]

Mr. Turrentine said that in Houston, Tex., only two retail stores in the whole town used electric current for lighting. As to new buildings, about 3 years ago a large department store made an addition to its building, going from 3 to 6 stories. The Gas Company saw to it that the building was properly piped, with the result that the Company has the entire lighting for the uppor floors of the 6-story building. In Houston they had gas arc lamps in every retail, drug and merchandize store, save two. And they would have those two before 1912. [Laughter and applause.]

Mr. Macbeth thought Mr. Elliott's complaint was there was not sufficient of this matter one could get his hands on for publication. Many of the members assumed from that statement that he meant there were not sufficient installations. He remembered having talked to one of the biggest new business men in the country, who told him of the large number of lamps he put up on two certain streets, and when asked why he didn't use that in his newspaper publicity, he replied, "I dare not; if I did the electric men would come along, go into that street and clean me out."

Mr. Elliott said the reports had interested him very much. The last speaker only confirmed the opinion he had often heard that there was really nothing the matter with Texas. In fact, there was not anything the matter, so fas as he could see, in regard to getting these installations, except the gas companies. They could get them if they went after them. That was the point he tried to make in the paper. If they went after these with the right argument, material and appliances they could all be secured. That covered the subject as far as he could present it.

(To be Continued.)

Interesting Legal Opinions
RESPECTING GAS PRACTICE.

Mandamus as a Means of Compelling Gas Company to Install Meters.—The case of Hallett and others *vs.* the Seattle (Wash.) Lighting Company, decided by the Supreme Court of the State of Washington, and reported in 110 Pac. Rep., page 799, involved the right of a company to make reasonable rates. The plaintiffs were the owners of a 3-story building in the city of Seattle, containing 27 departments. The building was piped for gas so that each apartment would have a separate service through a meter to be installed in a closet in each apartment. When the building was about completed the plaintiffs demanded of the defendant Company that it connect the building with its mains, that it install a separate meter in each apartment and furnish gas for the use of the tenants. The Company refused to comply with the plaintiffs' demand on the ground that the building was not equipped with pipes in accordance with its rules regulating the installation of meters. The rule in question was one requiring owners of apartment houses, or other buildings having need for more than one meter, to provide a separate meter room on each floor, or a room in the basement where all the meters could be placed. The plaintiffs were notified of this rule before they commenced the erection of their building, but they refused to comply with it. The Company offered to install one meter for the entire house, but the plaintiffs insisted upon having a meter in each of the 27 apartments, and, by a writ of mandamus, sought to compel the Company to meet their demands. The question for the court to decide was whether or not the Company's rule as to meters was a reasonable one. In respect of this, in "Twenty Cyc.," page 1162, it is said:

"A gas company may, in the discharge of its duties to the concnosumer, govern its action by reasonable rules and regulations, and, when it has done so, all persons dealing with it, as well as the company itself, must yield obedience thereto. Since, however, the business of supplying gas to consumers as generally conducted is effected with a public interest, the rules and regulations of a gas company must be applicable to all consumers alike." The relief demanded by the plaintiffs was refused. The following extract from the opinion will indicate the reasons of the court in holding in favor of the Company:

"The controlling question on this appeal is whether the rule adopted by the respondent (Company) is a reasonable one. The trial court found that it is, and from all the evidence we conclude that the finding must be sustained. Evidence was introduced by the respondent sufficient to show that it would be a much more sanitary arrangement to locate the meters in one inclosed room than to distribute them throughout the various apartments as demanded by appellants (plaintiffs); that there would be less danger of explosions in case of fire; that leaks in the various pipes located in partitions throughout the building could be more readily found; that repairs in pipes serving the separate apartments could be made without interrupting the supply of gas to any apartment other than the one where the repair might be needed, thus avoiding unnecessary inconvenience to tenants; that collections from prepayment meters could be more readily and easily made, and that the high city pressure, which would not extend beyond the meters when installed, could be confined to the main service pipes. Although the evidence on these various points was in sharp conflict, the trial judge accepted and credited that offered on behalf of the respondent, and we cannot conclude that he erred in so doing. His conclusion that the rule was a reasonable one and should be enforced must be sustained.

"Appellants contend that the respondent has not uniformly enforced the rule in question, that it has waived compliance in a number of cases, and that it cannot enforce it against one consumer unless it does so against all. The evidence does not sustain this contention. The rule has been in existence only 1 or 2 years. Some consumers had piped their buildings for meters in separate apartments before being informed of its adoption by respondent, or having any knowledge thereof. Under these circumstances, the respondent did, in a few instances, waive the rule, but it has invariably refused to do so where the consumer had notice of the regulation before piping his building as the appellants undoubtedly did in this case- The rule is being strictly enforced. Appellants now insist that, in any event, they were entitled to a writ of mandamus compelling the respondent to make a connection with its mains, to install a single meter, and to supply appellants and their tenants with gas, that the trial court erred in dismissing the action, and that a peremptory writ should have been issued afforded relief to this extent, although not all the relief demanded. There is no doubt but that less relief can be awarded by writ of mandate than was originally demanded where the relator is entitled to such partial relief. State *ex rel.* Maltbie *v.* Will, 54 Wash., 453, 103 Pac., 479, 104 Pac., 797. The record before us shows, and the trial court found, that prior to the commencement of this action, and again on its trial, the respondent offered to connect the building with its mains, to install a single meter and to furnish gas. The appellants in effect rejected this offer by proceeding with the trial upon the theory that they were entitled to a writ compelling the installation of 27 separate meters in the manner demanded. They are in no position to now insist upon a reversal for the purpose of avoiding costs. Upon the filing of the remittitur, they may, if they so desire, but without costs to respondent, have an order entered requiring a continuance of the service and supply through the single meter which is now installed."—BRADY.

Vertical Retorts at Manchester, N. H.

[Prepared for the Sixth Meeting, American Gas Institute, by MR. WALTER G. AFRICA, Manchester, N. H.]

In the winter of 1907–08 we erected 2 benches of 9 vertical retorts each. Only one of these was equipped for operation, and its behavior was mentioned in the "Proceedings," 1908.[1]

We then decided to try different sized retorts in order to find what size and taper were best suited for our coals. To do this, we tore out the retorts of the bench we had previously started, and put in 5 retorts of 4 different sizes and tapers. These retorts varied from 20 by

1. AMERICAN GAS LIGHT JOURNAL, Nov. 23, 1908, p. 884.

(*Continued on page* 346.)

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NEW YORK, MONDAY, NOVEMBER 27, 1911.

BRIEFLY TOLD.

LIABILITY OF HOTEL PROPRIETOR FOR DAMAGES CAUSED BY DEFECTIVE GAS FIXTURE.—The syllabus of the case of Patrick *v.* Springs, recently put forth in the "Southeastern Reporter" (70, p. 394), seems of sufficient merit (even though connected with a small community) to give its salient features this prominence. It was an action brought against the proprietor of a hotel in Washington, N. C., for damages suffered by the plaintiff as a result of having been assigned to a room equipped with a defective gas[1] fixture. The evidence tended to prove that, in the room of the defendant's hotel, which the plaintiff occupied, was a gas burner which lacked a stop or safety-pin, so that the key could be turned all the way round. When the plaintiff turned out the gas he discovered that there was no stop-pin. He carefully turned the key to the place where it should stop and he testified that, after doing so, he could smell no gas. During the night the room filled with gas, with serious effects upon the plaintiff's health. In affirming a verdict for $250 in favor of the plaintiff, the Appellate Court (Supreme Court of North Carolina) said: "There has been considerable discussion by judges and text-writers as to the liability of an innkeeper for personal injuries sustained by a guest. Cases are to be found where the innkeeper has been held liable for assaults by servants, and cases *contra;* but it seems now to be well settled that, in case of an injury occurring in consequence of the unsanitary condition of the inn premises, or room, to which a guest is assigned, the innkeeper is liable upon the same principles applicable in other cases, where persons come on the premises at the invitation of the owner or occupant and are injured in consequence of their dangerous condition." The Court further said: "The innkeeper is not an insurer of his guests' personal safety, but his liability does extend to injuries received by the guests from being placed in an unsafe room. This is a matter peculiarly within the innkeeder's knowledge and entirely beyond the control of the guest. In that particular he is peculiarly within the innkeeper's power and protection. Ten Broeck *v.* Wells (C. C.) 47 Fed. 390; West *v.* Thomas, 97 Ala. 622, 11 South, 768; Stanley *v.* Bircher, 78 Mo. 245; 16 Am. & Eng. Ency. of Law (2d Ed.) 547; Sandys *v.* Florence, 47 L. J. C. Pl. 598; 22 Cyc. 1081. This is not only the settled law of this country, but is held by the courts of Great Britain. One who keeps a public house extends an invitation to all to come to his premises, and is, therefore, liable for injuries sustained in consequence of the bad condition of his inn premises, Oxford *v.* Prior, 14 W. R. 611. This principle is applied in cases of warehousemen, common carriers and the like. Finch *v.* Railroad, 151 N. C. 106, 65 S. E. 742; Fetter on Carriers, 228. When the plaintiff proved the unsafe and defective condition of the gas fixture, in consequence of which gas escaped during the night and injvred him, he made out a *prima facie* case of negligence, which it was defendants duty to answer.

"The learned counsel for defendant, Mr. McMullan, in a well-considered argument, insists that the glaintiff is guilty of contributory negligence upon his own evidence, and for that reason the motion to non-suit should have been sustained. We are not prepared to go that far, under the circumstances in which plaintiff was placed. It is undoubtedly true that, if the defect is an obvious one, the guest must use reasonable care on his part, and if he is himself negligent and could have avoided the injury by due care, he cannot recover—22 Cyc. 1081, and cases cited. There are circumstances when the court can declare, as matter of law, whether a person has exercised reasonable care, but there are conditions when the question can only be solved by adopting the rule of the prudent man and submitting the matter to the jury. We think, under the conditions surrounding plaintiff, it cannot be fairly held that he necessarily failed to exercise due care as a matter of law. He fixed the key, as he thought, safely, so as to cut off the gas. Smelling none, he retired and went to sleep. The gas may have escaped through the loose key during the night by reason of continued pressure; the key not being firm enough in place to hold it. We think the question one peculiarly for the jury under such circumstances, and that it was fairly presented by the court to them."

The case is that of Patrick *v.* Springs, reported in 70 Southeastern Reporter, page 394.

1. A "process" gas, in the nature of the acetylene sort, is concerned in the case.

THE WORLD'S PRODUCTION OF COAL.—"New Series, No. 27," "Press Bulletin" of the United States Geological Survey, shows that in respect of the world's production of coal, the United States, in 1910, took a long lead as a coal producer. The summary given is:

The total coal production of the world in 1910 was approximately 1,300,000,000 short tons, of which the United States contributed about 39 per cent. This country has far outstripped all others, and in 1910, according to the United States Geological Survey, it exceeded Great Britain, which ranks second, by over 200,000,000 tons. Great Britain's production in 1910 was less than 60 per cent. of that of the United States, and Germany's was less than half. The increase in both of these countries, in 1910 over 1909, was comparatively small, whereas the increase in the United States was nearly equal to the entire production of France and was more than the total production of any foreign country except Great Britain, Germany, Austria-Hungary and France. The United States has held first place among the coal-producing countries of the world since 1899, when it surpassed Great Britain. In the 11 years since 1899 the annual output of the United States has nearly doubled, from 253,741,192 short tons to 501,563,378 tons, whereas that of Great Britain has increased only 20 per cent. from 246,506,155 short tons to 296,007,699 tons. The following table shows the coal production in short tons, of the principal countries of the world in 1910, except those for which only the 1909 figures are available:

Country.	Tons.
United States (1910)	501,596,378
Great Britain (1910)	296,007,699
Germany (1910)	245,043,120
Austria-Hungary (1909)	54,573,788
France (1910)	42,516,232
Belgium (1910)	26,374,986
Russia and Finland (1910)	24,967,095
Japan (1909)	16,505,418
Canada (1910)	12,796,512
China (1909)	13,227,600
India (1909)	13,294,528
New South Wales (1909)	7,862,264
Spain (1909)	4,546,713
Transvaal (1910)	4,446,477
Natal (1910)	2,572,012
New Zealand (1909)	2,140,597
Mexico (1909)	1,432,990
Holland (1909)	1,235,515
Queensland and Victoria	1,119,708
Italy (1909)	611,857
Sweden (1909)	272,056
Cape Colony (1909)	103,519
Tasmania (1909)	93,845
Other countries	5,236,903
Total	1,278,577,812
Percentage of the United States	39.2

CURRENT MENTION—

THE "Humphrey, No. 30" folder is a beauty. Although in appearance—that is, as to size and printing make-up—quite like a "through time table" on a trunk line of railroad, it differs from the latter in that one is never non-plussed over discovering the meaning of its text and the applicability of its figures. Wherefore the folder is to be doubly (or several additional times) commended.

THE New York Supreme Court (through Justice Guy) some days ago signed an order declaring that the East River Gas Company is the owner of perpetual easements to sufficient property under the East river to permit of the construction of two tunnels from the plant of the Astoria (Long Island) location of the Consolidated Gas Company to Manhattan borough proper at 110th street, and to West 134th street in the Bronx district. The city was the complainant in the premises. The Court also appointed Messrs. Enos S. Booth, James J. Coogan and Benjamin Butman, as Commissioners, to appraise the value of easements for the land continuation of the tunnel terminals. A peculiar thing in connection with this instance is that the Hearst-Brisbane dispensers of food thought, of the worse-than-buncombe variety, have made no fervid appeals to the public over this wanton giving away of the "people's property." The decision of the Supreme Court in the instance above cited is quite similar to the course that the Legislature was asked to sanction, by special bill some years ago, through the vehicle of what became famous under the title of the "Remsen Gas Grab." That "grab," although it resulted in the putting out of the political arena of a popular politician and respected man, in the person of Mr. Remsen, who was its sponsor in the Assembly, was nevertheless upheld in the court of last resort in New York. All the "grab" that ever was contained therein was a grab at time, which would have saved the Company 24 months' delay in the completing of a beneficent work. Surely, it would have benefited the Consolidated Gas Company, but it would also have insured to the residents of the Empire City a safe transmission of an adequate supply of a current that appeals in a multitude of ways to the need, convenience and comfort of at least 80 per cent. of its inhabitants, be those as they may, respectively, from the millionaire class to the veriest pauper on Blackwell's Island.

THE long-deferred case, now in the United States Supreme Court, of the contention that the Lincoln (Neb.) Gas Company should not charge a certain sum for gas—the authorities of the city being the contenders—will come up at the December term. The difference is 20 cents per 1,000 cubic feet, and the impound thereof now amounts to something over $300,000. The case dates back to January 1, 1907—virtually 5 years.

THE capital stock of the Kirksville (Mo.) Gas, Heat and Electric Company has been increased to $100,000. It was $50,000.

THE regular quarterly dividend (1¾ per cent.) on the capital stock of the American Gas Company has been declared. It is payable the 1st prox.

WE are told that the annual meeting of the Bay State Gas Company, of Delaware, which was held in Wilmington (Del.) the 21st inst., was qnite a lively session, one of the brands who contributed to the burning being Mr. C. W. Withington, of New York. Mr. Withington held a single-share proxy, from Messrs. Hayden, Stone & Co., of New York, and some of his questions were so irritating to those in control that he was finally subdued (or quieted) by the adoption of a resolution exacting that all requests for information must be presented in writing. One of the Withington questions boldly asked as to the business in which the Company was engaged. He was told that it was a holding corporation; further on it developed that the particular thing it "held" was a controlling interest in the National Hartel Light Company, which "appears to be an operating Company." The Directors elected were: T. W. Lawson, J. Frank Allee, W. Harry Miller, E. A. McSweeney, Newell Ball, S. John Abbott and J. V. McCommons. The Directors elected these officers: President, T. W. Lawson; Vice-President, J. F. Allee; Treasurer, W. H. Miller; Secretary, E. A. McSweeney.

INTERESTING current financial notes are: The Laclede Gas Light Company, St. Louis, Mo., has sold (through Harris & Forbes, of New York) $818,000 of its authorized refunding bond issue of $20,000,000, to partly pay for completed improvements on the plant and for those underway. The Company has also declared these dividends: On the preferred, semi-annual of 2½; common, quarterly, 1¼; both are payable the 15th prox

THE last report of the Mobile (Ala.) Gas Company, covering its affairs for the past 9 months, shows net earnings of $46,448; and the last annual of the Kansas City Railway and Light Company shows net earnings of $3,277,140. This means a gain of $269,353 for the year.

RESPECTING the recent action of the Directors of the Brooklyn Union (N. Y.) Gas Company, in declaring an extra dividend of 1 per cent. out of the last quarter's earnings, the "Boston Bureau," of the 18th inst., printed an extremely interesting article, which should be read by everyone interested in this well-managed Company's affairs. An especially interesting excerpt therefrom is this: "* * * What Brooklyn Union will do with this problem of undercapitalization cannot be forecasted. In days before the creation of the Public Service Commission a substantial stock dividend would have been declared, but to-day any increase in capitalization to get their approval must be sold at least at par and not distributed to holders for the sake of surplus reduction. Yearly dividends of 10 per cent. would only hold the extremely strong financial position right to its present strength. These earnings, however, cannot be concealed by so small a Company as Brooklyn Union, although larger companies meet with better success."

BOOK REVIEWS.

Construction and Management of Small Gas Works.—A compact, readable and fully illustrated book of 250 pages, covering the subject named in the title, by Mr. Norton H. Humphrys, our Special English Correspondent. The book carries an extra section on "Actual Costs and Capacity of Recently Erected (British) Works," by Mr. J. H. Brearley. Published by Messrs. John Allan & Co., and for sale by the AMERICAN GAS LIGHT JOURNAL at $3. The author has handled the subject so as to cover new as well as old plants, and gives specific recommendations and the reasons therefor for both the engineer and the manager. The facts that the work covers English practice, and that the number of American companies sending out about 5 million cubic feet is small, do not curtail either its value or its usefulness. There has long been a demand for an American work on this subject and the Humphrys-Brearley work should, to a fair extent, respond to our needs in this respect. That the authors are competent men on the lines treated will require no declaration from us. Both are gas engineers whose ability is conceded in their country. And (a rare combination in England or any other country) further, the faculty of reducing to plain print, in finished diction, their thoughts is in rare degree the happy possession of both the gentlemen named.

Publications.

[All Publications, Catalogues, etc., mentioned below, are kept in our office for the convenience of our patrons.]

Baltimore Post Cards.—Another installment of the business-getting, illustrated "Post Cards" of the Baltimore (Md.) Gas and Electric Corporation, is being distributed. The present series is devoted to the portraying of lighting, and the illustrations given of handsome installations should prove a valuable aid to their representatives in securing contracts for new accounts. The various types of Welsbach indoor and outdoor lamps are sold and maintained by the Company.

Chicago Leaflets.—The recent leaflets issued by the Peoples Company, of Chicago, cover heaters and "cottage arcs." These leaflets are 8½ by 11 inches in size, printed on heavy paper; are well illustrated; and the text is timely and interesting.

Street Railway Transfers, St. Louis, Mo.—The St. Louis (Mo.) Public Service Commission has issued a report on the Transfer System of the United Railway Company of that city. The report consists largely of maps covering car routes, transfer points, etc.

Publications of the Bureau of Standards.—The Bureau of Standards, Washington, D. C., has issued "Circular No. 24," which contains a descriptive list of the numerous publications issued up to the 1st ult. The circular and the various publications may be obtained upon request.

Annual Report (Vol. I.), Public Service Commission, New York, First District.—The first volume, covering part of the annual report of the Public Service Commission, First District, New York, which has to do with the gas, electric and street railway corporations in the city of New York, for the year 1910, is now ready for distribution. This portion relates to the work of the Commission and chiefly concerns the registering of routine matters, such as orders, etc. Gas and electric meter tests are in interesting detail; also, a lengthy report on franchises of electrical corporations in Greater New York. Copies may be obtained from the Commissioners, by addressing them at 150 Nassau street, New York city.

(*Continued from page* 343.)

34 inches at the bottom to 16 by 22 inches. We finally chose the latter as being best suited for our setting although all worked well. The 2 benches were then equipped with this size retort, 18 in all, and the plant provided with a shelter over the retorts and the recuperator side of the bench; the rest was left exposed to the weather.

We started charging the retorts about June, 1910, and, with the exception of a shutdown to change the closing devices, which were defective, the setting has been running since and has been most promising. At first we were troubled with the lower lids leaking badly, but, by adding a clinching device, we have reduced this leakage to a point where it is of no consequence. Three retorts are charged and discharged at one time, they being connected to 1 gas take-off.

We have in all our experiments with these retorts had unusually high candle powers for vertical retort systems, and this we attribute to the fact that we leave a space of 4 feet of heated retort above the coal for the gas to pass through, thus fixing the vapors which, in systems of full retorts, do not reach the proper temperature for gasification. A test was made the early part of this year, in which all apparatus was carefully standardized and tested, and facilities provided to get most accurate resulis. Candle powers and calorimeter readings were taken at frequent intervals through a mixing tank. A pentane lamp was used for the photometrical standard, and a Junker calorimeter for calorific values. Both tar and ammoniacal liquor were collected in isolated tanks, carefully measured and analyzed. Coke results were obtained by weighing it hot.

The coal used was ¼-inch, screened, from Farmington, W. Va. The following is a summary of the test:

Quantities.	Volumes.
Yield per pound	5.59 cubic feet.
Yield per net ton	11,180 "
Yield per gross ton	12,522 "
*Average candle power, flat flame	13.47
Average candle power, Sugg D	16.47
Average candle power, Met. No. 2	18.97
Candle-feet, flat flame	75
Candle-feet, Sugg D	92
Candle-feet, Met. No. 2	106
Calorific value, per foot	600 B.T.U.'s.
Calorific value, per pound	3,353 B.T.U.'s.

RESIDUALS.

	Per Net Ton.	Per Cent. Coal.
Coke	1,350 pounds.	67.5
Tar (dry)	14.4 gallons.	6.73
NH_3	6.17 pounds.	....

* Candle power readings were taken with a flat flame burner, but a number of readings were taken with the Sugg D and Metropolitan No. 2 to establish their relative values.

Furnace fuel was 13.27 per cent. of coal carbonized; or combustible charged into furnace, 11.77 per cent. If allowance is made for fuel in ash thrown out, this figure would be lower. These benches are, as stated above, exposed to the weather, and the thermometer went close to zero at night during the test.

The following table gives the working results for 5 months. West Virginia coal from Lincoln Mines was used, shipping weight being taken and allowance of 2½ per cent. made for moisture.

The furnace fuel did not show up as well as in the short test above, due to various reasons, the principal one being that the coal used contained considerable slack through being broken up by frequent handling en route. This slack required more heat, to burn off than clean lumps.

The wide variation in the monthly yields is not due to a lack of uniformity in the operation of the benches, but is caused by the necessity of periodically charging off discrepancies in the coal stock, that accumulate from losses in shipment, etc. We have had no trouble from coke not discharging freely, except when the charges are not burned off. This, however, seldom occurs. Both primary and secondary are measured with Venturi meters, and the average CO_2 in waste gases is close to 19 per cent.

We are adding two benches of 9's to our plant this fall, which will give us a total capacity of 500,000 cubic feet per day. A similar plant of 5 benches of 9's is also being erected in Philadelphia, and will be operated shortly. In their present form, we regard our Manchester verticals a marked success.

Working Results.

	April.	May.	June.	July.	August.	Total and Av.
Corr. gas made, 1,000 cubic feet	6,782	7,324	7,072	7,074	7,213	35,493
Coal carbonized, pounds	1,229,003	1,306,150	1,256,305	1,210,500	1,336,225	6,338,288
Average weight per charge, pounds	914	911	945	925	950	929
Yield per pound, cubic foot	5.52	5.28	5.63	5.84	5.40	5.69
Average candle power flat flame, 70° F	13.90	13.70	14.10	14.85	13.87	14.08
Average candle power Argand "D," 70° F	16.90	16.70	17.10	17.85	16.87	17.08
Average candle power No. 2 Metropolitan, 70° F	19.40	19.20	19.60	20.35	19.37	19.58
Candle-feet per pound flat flame, 70° F	76.73	73.71	79.38	86.72	74.90	78.71
Candle-feet per pound Argand "D," 70° F	93.29	89.85	96.27	104.24	91.10	95.48
Candle-feet per pound No. 2 Metropolitan, 70° F	107.09	103.30	110.35	118.84	104.60	109.45
Coke used, furnaces, pounds	180,905	196,950	175,740	157,680	184,525	895,800
Coke used, furnaces, per ton coal, pounds	295	302	280	260	276	283
Coke used, furnaces, per cent. coal carbonized	14.7	15.1	14.0	23.0	13.8	14.15

Actual Leakage in Unaccounted-for Gas.

[Prepared by MR. JACOB D. VON MAUR, for the Sixth Meeting, American Gas Institute.]

"Little uncollected bills; little leaks of gas; little slow or D. R. meters; thus the profits pass."

Judging from latest reports of the U. S. Geological Survey, there will be manufactured in the United States during the year 1911 more than 180 thousand million cubic feet of gas, and of this amount approximately 6 per cent., or 10,800,000,000 cubic feet, will have been lost by actual leakage, or in other ways unaccounted-for. Just how much this loss amounts to in dollars and cents depends entirely on the items which go to make up the total of unaccounted-for gas. These items are roughly divided into three general classes:

1. Actual loss, due to actual leakage of gas; 2, losses due to slow D. R. meters, or to temperature conditions under which the gas is measured, etc.; 3, unaccounted-for gas, due to methods of accounting.

From a financial point of view the losses due to Class 2 are by far the most important, as gas which has been manufactured, distributed and actually sold represents a loss equal to the selling price of the gas. For instance, if John Smith uses 5,000 cubic feet of gas at $1 per 1,000, his bill should be $5, but if his meter only registers 4,000 cubic feet, he will actually pay $4, a loss to the company of $1, or the full selling price of 1,000 cubic feet of gas.

Losses due to actual leakage of gas, Class 1, on the other hand, are equal only to the cost put into the gas up to the point of leakage; but, owing to the potential danger of leaking gas, it is of the utmost importance that leakage from this source should be kept to a minimum.

The unaccounted-for gas, due to methods of accounting, Class 3, includes such items as corrections for gas at the works, differences due to the time of reading meters, etc. It is well to note in passing that the increased sales for the last half of December of each year will also appear as unaccounted-for gas in cases where the fiscal year corresponds with the calendar year. It would be better in considering the unaccounted-for gas to have the record made for the year ending with the end of the month having the least consumption.

It is safe to say that the money value of the unaccounted-for gas in the United States is between $6,000,000 and $8,000,000 annually, an amount equal to interest on a capital of $100,000,000. How much of

this loss is due to actual loss of gas to the company, and how much of it can be saved by improved methods is more important than the question as to how the unaccounted-for gas can be reduced by different methods of computing it; but if the item "Unaccounted-for gas" is to be used for comparative purposes—as, for instance, to determine the relative conditions of varions distribution systems—then the methods adopted for ascertaining its value should certainly all be on a similar basis. Unfortunately this is not the case, so that it is very difficult to obtain a correct idea as to the efficiency of the operation of one company as compared with another, from any published data. The report of the United States Geological Survey shows that the percentage of unaccounted-for gas is by no means uniform. In 1907 it varied from 1.6 per cent., in Pennsylvania, to 22.7 per cent. in Nevada, New Mexico and Utah; and in 1908 the variation was from 1.9 per cent., in Pennsylvania, to 18.4 per cent. in Virginia and West Virginia, but the average for the two years remained the same, namely, 5.9 per cent. Reports also show that the percentage of unaccounted-for gas varies very considerably in each State for different years.

Methods of Reporting Unaccounted-for Gas.—Published reports from foreign cities seem to indicate a more uniform method of accounting, and consequently more uniform results. Below is given the result obtained in various cities in Europe:

Percentage of Unaccounted-for Gas in Various Cities of Great Britain.

Cities.	Per Cent.	Cities.	Per Cent.
Birmingham	5.2	Derby	6.2
Bradford	4.8	Dublin	8.6
Brentford	5.7	Dumfries	8.5
Bristol	7.0	Edinburgh	5.9
Bolton	5.3	Glasgow	8.7
Commercial	6.3	Halifax	8.5
Croydon	5.9	London	5.3

Percentage of Unaccounted-for Gas in Various Cities of Germany.

Cities.	Per Cent.	Cities.	Per Cent.
Berlin	3.2	Karlsruhe	5.9
Breslau	3.6	Konigsberg	4.7
Bremen	4.0	Kiel	5.7
Basel	2.5	Leipzig	5.6
Barmen	6.3	Lubeck	4.8
Braunschweig	3.9	Lodz	3.8
Copenhagen	5.3	Magdeburg	7.4
Charlottenburg	4.1	Mannheim	5.6
Cologne	3.1	Mainz	7.6
Chemnitz	2.2	Mullhausen.	7.0
Crefeld	8.1	Magdeburg	8.6
Cassel	5.6	Nurnberg	3.3
Dessau	6.0	Posen	5.9
Dresden	4.3	Plauen	2.8
Dusseldorf	5.9	Pforzheim	3.4
Danzig	4.0	Rixdorf	3.1
Duisburg	10.0	Stockholm	3.7
Darmstadt	1.9	Saarbrucken	6.0
Elberfeld	6.0	Stettin	3.7
Essen	13.0	Strasburg	10.6
Genf	5.1	Stuttgart	1.2
Hamburg	2.8	Wiesbaden	4.7
Halle	4.9	Zurich	4.3

I understand that French engineers consider a leakage of 1 cubic meter of gas per meter run is the practical minimum that can be expected in good practice, and that one-third of the total is due to leaking joints. This is at the rate of approximately 85,230 cubic feet per mile of main. Whether this figure is based on a straight mile basis, or on a basis of leakage per mile of 3-inch main, I have been unable to learn. The method of reducing the leakage and unaccounted-for gas to a basis of so many thousand cubic feet per mile of equivalent 3-inch main is very objectionable, and for different reasons the reporting of this item as a certain per cent. of the send-out is very misleading.

Dr. A. C. Humphreys, in a paper read before the Institute last year, showed clearly how "The Public (is) Deceived by Misleading Analysis of Data," and this paper might well be extended to show how gas men are misled in dealing with reports covering unaccounted-for gas data. As a matter of fact it is impossible to represent the condition of a distribution system by either of the above methods. One management may increase profits by increasing sales, while the property is allowed to run down, whereas another management may neglect the sales and still make a fair showing by careful and economical oversight of operation; but good management should combine the advantages of careful operation with those of an energetic commercial policy.

Assume, for illustration, a company having the very simplest form of distribution system, made up of 1 mile of 6-inch cast iron main, and one consumer located at the far end of the main. Furthermore, assume that the gas has been correctly measured at the works, and also at the consumer's meter, and that the actual leakage in the main from holder to consumer is 50,000 cubic feet per annum, and that the total output is 500,000 cubic feet per annum. The actual leakage under the above conditions would then be 10 per cent. of the output. Under the same conditions, assume that the output is doubled to 1,000,000 cubic feet per annum. The distribution system is exactly the same, and the leakage in the main system is exactly the same, but the unaccounted-for gas is now only 5 per cent. The management would, therefore, be credited with having reduced the leakage to one-half, and it might be assumed that the distribution system had been put in very much better condition than it previously was; but, as a matter of fact, the conditions are precisely the same.

If we assume another company, operating under precisely the same conditions, with precisely the same amount of actual leakage, but having a 3-inch main instead of a 6-inch, as in the previous case, and then reporting the amount of unaccounted-for gas as leakage per mile of equivalent 3-inch main, the leakage of the first company would be reported as 25,000 cubic feet per mile of equivalent 3-inch main, and of the latter company as 50,000 cubic feet, and again the deduction might be made that the system of the first company was in 50 per cent. better condition than the company having the 3-inch main, and that it had only one-half the leakage; but, as a matter of fact, it is more discreditable to have a leakage of 50,000 cubic feet on 1 mile of 6-inch main than on 1 mile of 3-inch main, and it would be more advisable to spend money in order to reduce leakage in the former case than in the latter.

I wish particularly to emphasize the fact that, in dealing with actual leakage from mains and services, there is no connection between the amount of gas sold and the actual leakage. If the mains and services are simply filled with gas under ordinary distribution pressures, the actual leakage will be the same whether no gas is sold, or whether the consumption is 100,000,000 cubic feet per year. We can, therefore, gain no very intelligent idea as to the condition of the distribution system by reporting the unaccounted-for gas, either on a percentage basis, or as unaccounted-for gas per mile of equivalent 3-inch main.

The theory back of the practice of reporting leakage on a 3-inch mile basis is based on the supposition that the actual leakage will be in proportion to the circumference of the joints. No allowance is made for increased leakage due to the high pressures used in the reinforcing mains, nor is any consideration given to the leakage from service pipes, etc.

Our experience in St. Louis seemed to demonstrate that the greater part of actual leakage does not originate in the joints at all. Leakage is made up of a multitude of very small defects. A leakage of 1/40 of a cubic foot per hour, known as a pinhole leak, cannot ordinarily be detected by the sense of smell, and is very likely to be overlooked in testing out joints. If the gas from such a leak could be lighted it would represent a flame ¼ the size of the pilot light of an ordinary 71,306-mantle lamp. The following table is given to show the magnitude of the amount of gas that would escape annually at the various rates of leakage per hour shown, and also the amount of gas that would escape from 1 mile of main per year, if there were a leak at each joint of from 1/40 of a cubic foot per hour and upward.

TABLE No. 1.

Rate of Leakage per Joint per Cubic Feet per Hour.	Equivalent Cubic Feet per Year per Joint.	Cubic Feet per Year per Mile of Main
1/40	219	96,360
1/20	438	192,720
1/10	876	385,440
1/5	1,752	770,880
1/2	4,380	1,927,200
1	8,760	3,854,400
2	17,520	.....
3	26,280	.....
4	35,040	.....
5	43,800	.....
6	52,560	.....
7	61,320	.....
8	70,080	.....
9	78,840	.....
10	87,600	.....
20	175,200	.....
30	262,800	.....
40	350,400	.....
50	438,000	.....

TABLE NO. 2A.

Leak per Cu. Ft. per Mi. per Hr.	Leak per Mi. per Year,	Leak per Hr. 800 Miles.	Leak per Day 800 Miles.	Leak per Month of 30 Days, 800 Miles.	Leak per Year per 800 Miles.	Cost at 50c. 1,000 per Mile per Year.	Loss per Mi. Capitalized at 6 Per Cent.	Loss per 1,000 Lineal Ft. Capitalized at 6 Pr. Ct.
1.....	8,760	800	19,200	576,000	7,008,000	$4.38	$73.00	13.82
2	17,520	1,600	38,400	1,152,000	14,016,000	8.76	146.00	27.64
3	26,280	2,400	57,600	1,728,000	21,024,000	13.14	219.00	41.46
4.....	35,040	3,200	76,800	2,304,000	28,032,000	17.52	292.00	55.28
5.....	43,800	4,000	96,000	2,880,000	35,040,000	21.90	365.00	69.13
6.....	52,560	4,800	115,200	3,456,000	42,048,000	26.28	438.00	82.92
7.....	61,320	5,600	134,400	4,032,000	49,056,600	30.66	511.00	96.74
8	70,080	6,400	153,600	4,608,000	56,064,000	35.04	584.00	110.56
9.....	78,840	7,200	172,800	5,184,000	63,072,000	39.43	657.00	124.38
10.... ...	87,600	8,000	192,000	5,760,000	70,080,000	43.80	730.00	138.00
20.....	175,200	16,000	384,000	11,520,000	140,160,000	87.60	1,460.00	276.40
30.....	262,800	24,000	576,060	17,280,000	210,240,000	131.40	2,190.00	414.60
40.....	350,400	32,000	760,800	23,040,000	280,320,000	175.20	2,920.00	552.80
50.....	438,000	40,000	960,000	28,800,000	350,400,000	219.00	3,650.00	691.30
60.....	525,600	48,000	1,152,000	34,560,000	420,480,000	262.80	4,380.00	829.20
70.....	613,200	56,000	1,344,000	40,320,000	490,560,000	306.60	5,110.0C	967.40
80.....	700,800	64,000	1,536,000	46,080,000	560,640,000	350.40	5,840.00	1,105.60
90.....	788,400	72,000	1,728,000	51,840,000	630,720,000	394.20	6,570.00	1,243.80
100..	876,000	80,000	1,920,000	57,600,000	700,800,000	438.00	7,300.00	1,382.00

Table 2A. shows total leakage for 1 mile and for a system of 800 miles at various rates of leakage, also the corresponding financial loss and the amount of money per mile that could be expended to just equal the loss due to escaping gas.

Note.—As an illustration, assume a leakage of 10 cubic feet per hour, then the cost of lost gas at 50 cents per 1,000 would equal $43.80 per year. If by spending $730 this mile of main could be put in a condition so as to save the entire amount of lost gas for all future time, the financial net result would equal the loss due to leaking gas.

The cost of 50 cents per 1,000 is assumed for comparative purposes only, and a separate table would have to be prepared in each case on a basis of actual cost for each separate company.

The following Table, No. 2, taken from the AMERICAN GAS LIGHT JOURNAL, is also interesting, as indicating the amount of gas which will pass through small orifices, such as rivet holes in holders, under various pressure conditions.

TABLE NO. 2.—*Leakage in Cubic Feet Per Year.*

Pressure in Inches Water.	1/16 Inch.	⅛ Inch.	¼ Inch.
2.....	58,040	232,228	929,129
4..	82,120	328,480	1,314,000
6.....	100,560	402,320	1,609,200
9.....	123,200	492,800	1,970,800
12.....	142,400	569,600	2,376,800
16.....	264,240	656,800	2,628,060
25.....	205,200	821,200	3,284,000

Pressure in Inches Water.	½ Inch.	1 Inch.	2 Inches.
2.....	3,716,520	14,866,200	59,464,800
4..... ...	5,256,000	21,024,000	84,096,000
6.	6,437,200	25,748,000	102,996,000
9.....	7,884,000	31,536,000	126,144,000
12.....	9,116,000	36,456,000	145.828,000
16.....	10,512,000	42,048,000	168,192,000
25.....	13,140,000	52,560,000	210,240,000

(To be Continued.)

Bristol's Frictionless Ink-Type Recording Instrument.

An illustrated description of Bristol's patented semi-transparent smoked chart recorder (patented by Mr. W. H. Bristol, April 13, 1909) has been previously published, and although these recorders are fundamentally simple in their construction, and hundreds are in daily service, there has been a call for a recorder in which the record is made with ink. To meet the demand for a frictionless, ink-type of recording instrument, to parallel the smoked chart recorder as nearly as possible in fundamental simplicity, and to accurately record fractions of milli-volts and adapted for use as a recording electric pyrometer, the instrument illustrated herewith has been developed and placed upon the market by the Bristol Company, of Waterbury, Conn.

These instruments, which have been thoroughly tested out in practical service for 2 years past, are the result of several years of study and experience with an original patented design of a frictionless ink recorder, using a hinged electrical movement, carrying a retaining receptacle for marking fluid, which extends over the path of the recording tip and is provided with means for periodically making contact with the source of marking fluid and the chart.

In the illustrations, Fig. 1 shows the recorder ready for operating.

Fig. 2 affords an interior view, showing the galvanometer movement case-hinged to the back of the instrument and carrying the inking pad in front of the recording arm.

Fig. 3 illustrates the sensitive electrical movement, swung to one side for convenience, in removing the record and inserting a fresh chart. The capillary gold tube (open at both ends) is carried at the end of the recording arm at right angles to the surface of the chart. The inking pad is suspended from the case of the electrical movement, and is curved to correspond with the arc covered by the motion of the end of the recording arm.

When the movement is swung back into its operating position, as shown in Fig. 2, the recording arm can swing free, thus accommodating itself to the position corresponding to the delicate current which is to be measured. The clock which revolves the chart at the desired speed also automatically presses the inking pad toward the

Fig. 1.

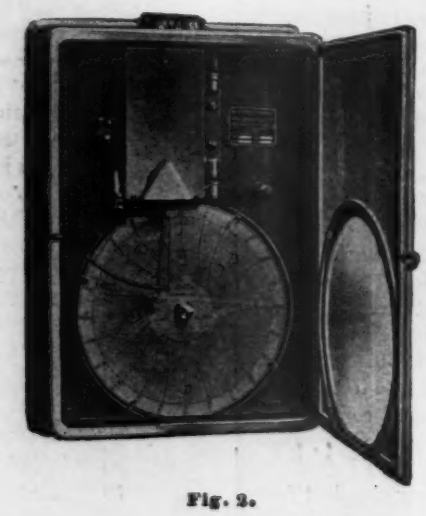

Fig. 2.

Fig. 3.

chart every 10 seconds, bringing one end of the capillary tube into contact with the chart, the opposite end being simultaneously brought into contact with the inking pad. A fine dot of ink is left on the chart and the capillary tube is replenished with ink from the pad. The recording arm thus carries a constant supply of ink, and its perfect balance (which is very important) is always maintained. The electrical movements used in these recorders are made especially for the purpose by the Weston Electrical Instrument Company.

Although the most important applications of these recording instruments have been for pyrometers, they have also been used for electrolytic research, recording-voltmeters and recording-shunt ammeters.

Special English Correspondence.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, November 8, 1911.

A New Lease for the Gas Exhibition.—Hire or Hire Purchase.

I have more than once observed that the gas exhibition is practically played out, but now find reason to modify that opinion, which was based on the original and now old-fashioned kind of show. The visitor entered a hot and somewhat crowded room, reeking with the fumes of products of combustion. Commencing with the first stall, he found a square compartment with two or three sizes of gas cookers, the same of gas fires and a gas heated bath. Apart from the utilitarian aspect, the shape of the apparatus and the black iron of which it was constructed did not admit of the artistic and striking arrangement that the visitor to a trade exhibition expects to find. Next was a stall of pendants and brackets, possibly a meter working in a glass case, and other things which, with the aid of colored glasses and brilliant lighting, could be made to give a pleasing effect. Next to this would be a third stall having a strong family likeness to the first—gas cookers and gas fires. And of the dozen or so stalls, more than half would be simply a repetition of the others. The man in the street, after inspecting Jones Paragon Cooker, does not feel very much interest in Smith's Belgravia pattern of apparently a precisely similar article, and gets decidedly bored when he is expected to follow on with a third edition in the shape of Robinson's Beathelot specialty. If the show is to be really attractive there must be some understanding between the various exhibitors, to avoid excessive repetition, or the selection of the exhibits should be controlled by one authority.

Not only have these, and other drawbacks that might be noted, been recognized and remedied, but the provider of a modern exhibition has a much wider choice of material. Besides having a greater variety to select from, the modern designs of apparatus are more artistic than of old, not only in respect to pattern, but also material. The modern incandescent gas burner affords excellent opportunity for pleasing effect, and the use of enamelled iron in a dozen different tints enables one to entirely avoid the ungainliness of nothing but black castings. A bright copper kettle or stewpan, a white enamel top and back plate, and a few colored enameled utensils, enable the cooker to be neatly embellished. Something really attractive can be made of a group of gas fires in different designs and colors. And while apparatus can be seen in use, care is taken to avoid such an absurdity as a row of say half a dozen gas fires all blazing full-on.

As an example of the resources available for the modern exhibitor, I was greatly impressed, a week or two since, by a visit to an exhibition at the Park Hall, one of the principal buildings in Cardiff, and arranged by the Cardiff Gas Company. The building was well suited for the purpose, and the light and elegantly designed stalls, of which white enameled wood and gilt relief were the chief features, were well spaced out with ample room for traffic between. This is an important item, as no one likes to be crowded and pushed about, or having to dodge elbows and umbrella handles. Palms and other greenery were tastefully disposed, and a high class orchestra gave instrumental selections twice daily. There were the usual cookery demonstrations and competitions, and a good supply of tastefully arranged pamphlets, leaflets, etc., so that no visitor could reasonably complain that he went away without being fully informed as to the arrangements made by the Cardiff Gas Company for the benefit and convenience of their customers in the way of hiring out apparatus, fixing free, or maintenance of burners. The exhibition was open daily for a fortnight.

A striking demonstration of the position held by the gas cooker in public esteem was afforded by a cookery and food exhibition, held in London by a highly influential Association, not interested in the gas industry, known as the Universal Cookery and Food Association. This body has been in existence for 22 years and holds an exhibition annually. It was observed that gas appeared to be the only fuel used in all the numerous demonstrations and competitions. The Gas Light and Coke Company contributed a completely equipped kitchen.

"Hire or hire-purchase" is one of the questions which, like the poor, seems fated to be always with us. There is much to be said, for and against, in respect to either system. Naturally one would prefer to sell the apparatus right out for ready cash, at a good 25 per cent. profit. And if consumers would only come in thousands and support this comfortable method of doing business, there would be no talk about hire or hire-purchase. No undertaking that was doing a brisk over the counter trade would wish to disturb such a pleasant state of things. Further than that I will venture to say that any gas undertaking who found that the local traders in the district—the ironmongers and plumbers—were taking care in a competent manner of the extended use of gas, and keeping up the sales to a reasonable proportion per consumer and per capita, as compared with others of similar size and circumstances, would be only too pleased to let well alone by not taking up the outside trade. But the usual position is that while the vendors of other agents such as candles, petroleum and electricity, have practically the control up to the point of ignition, and adopt hiring and anything else that will bring in business, the customary trade profits on gas stoves and fittings are not sufficient to induce the outside trades to take a real live interest in extending the use of gas, and that the gas undertaking is consequently under a great disadvantage. Some few are so conservative in their methods and ideas, that they accept this position as one of the ills of life that must be endured, and as a result practically take a back seat and do a very small range of business. But the majority prefer to be up and doing on their own account, with a view not only of increasing the number of consumers, but, and what is more important, increasing the consumption per consumer.

It is very evident that there are large and increasing numbers of users and prospective users of gas, who do not value the proud privilege of being the sole and whole proprietor and owner of a gas cooker, few gas fires, and gasfittings, especially when the cost of the same has to be provided for. But many of this class are willing to pay a few shillings per quarter in the form of hire for the use of the same. As much is evidenced by the wide success of the penny in the slot meter, a chief factor in that there is no specific charge for gasfittings. It is a common complaint on the part of the trade that the gas undertakings, in following up this important department, are taking away or killing their business. But it is impossible to take away or to kill a nonentity that never existed. The gas company may very safely guarantee to reimburse any shopkeeper who will produce substantial evidence from his trade books to prove that they have injured his trade. If anything, they have improved his prospects. For the chances of general and of odd jobbing trade in gasfitting must be greater where there are 2,000 gas consumers, than where there are only 1,000. People who do not use gas are deadheads from the trading point of view, and if the gas company increases its customers the prospects must be better all round. The actual facts are that of 1,000 customers taken on by means of the slot meter, probably not 10 of them ever spent sixpence on gasfittings in the last 20 years, or had any prospect of doing so in the next 20.

The slot system as generally applied is an example of simple hire. And it carries with it the important advantage that the whole installation remains the property of the company, and as such is subject to their control. To all practical interests and purposes gas companies are expected to accept responsibility up to the point of ignition, and it is well that they should. Dual or divided responsibility is never a success, as in case of trouble all the satisfaction to be got is "Not me, but the other party is in fault." And the unfortunate consumer may get landed between the two stools of the gas company and an incompetent fitter, one of the numerous body of ironmongers, plumbers or painters who call themselves gasfitters, but know nothing of even the most elementary principles relating to the composition or the combustion of gas. The only way of obtaining full control of anything is to buy it and own it. One can do as he likes with his own property, but not with his neighbors, and the gas company can have but a very limited, if any, control over property that belongs to the consumer.

There is the usual stock argument that the advantage of the apparatus belonging to the consumer is that he will take greater care of it, and be more likely to remain a permanent customer. To some

extent this is the case, especially while all is bright and new. The difficulty comes in when it gets old, and a fit candidate for the scrap heap. The customer may persist in using it long after it has ceased to be in efficient order, with the result that defects really due to the apparatus are credited or discredited as being inseparable from the use of gas. A burner gets enlarged and consequently the combustion is defective. When attention is called to the unpleasant smell of the products of combustion, the consumer does not realize or acknowledge the real cause, but says that the gas is bad; or it may be that an unnecessarily high consumption is the result, and that gas gets an undeservedly bad name as being costly. The point is sometimes so labored as to warrant the conclusion that, directly a customer gets a stove on simple hire, he sets to work to neglect and wantonly injure it, with the result that the working life is short and the demand for renewal frequent. My experience goes to show that the care bestowed upon a gas cooker or other apparatus is a question governed rather by the habits of the household than by the question of ownership. The proprietor of the establishment does not earmark each article, "Mine! be careful!" or "Gas Company! no matter," and probably no thought is taken by the servants or other actual users, one way or the other. The usual experience is that the customer appreciates the convenience of having appliances on hire and treats them with reasonable care.

The anticipated evils connected with simple hire are for the most part imaginary and have been dissipated by the light of experience. But when hiring was comparatively new and untried one was accustomed to hear all sorts of objections. Stoves would be seized and sold in distraint for rent, or made away with by dishonest persons, and, therefore, in each case a legally drawn agreement should be signed by landlord and tenant. Customers would come round once a twelvemonth and worry for a new cooker, or Mrs. A. would want one exactly similar to her friend, Mrs. B. There would be an enormous increase in capital outlay and in working expenses. As a matter of fact, however, I have never met with any instance of the hiring system being anything but a success. The mistake is sometimes made of running it too much on the usual purchase lines. When an article is sold it passes out of the control and interest of the vendor, but not so with an article let on hire. It must be kept under regular supervision, and, more than that, care must be taken to see that it is regularly used. Hiring is not taken up as a remunerative additional branch or department, but as a means of keeping up sales of gas. And one has to contend with what I might call indifference on the part of consumers. A cooker or heater may go neglected or unused for months on account of some trivial cause or difficulty. Perhaps the direction card supplied with the apparatus has been lost and, as a consequence, the proper way of using is not understood and trouble arises that creates prejudice; or there may be some trifling detail out of order that can be set right in a few minutes. It is no advantage to sell or let out apparatus if it is not used.

Hire purchase is sometimes regarded as a happy medium between purchase and hire, and as a means of securing the advantages of both. But, to all intents and purposes, it is a purchase. Whether the purchaser pays cash down, or 12 monthly installments, is merely a detail. There is really no go-between. Either the apparatus belongs to the customer, and as such goes out of the control of the sellers, or it belongs to the gas company and remains their property and subject to their control. Hire purchase is all very well for articles that retain their efficiency, without repair or other attention for 20 years or more. But for short-lived articles, such, for instance, as outside shop lamps, or for articles that require thorough overhauling once a year or so, it is not so satisfactory. The purchaser is annoyed to find, when he pays the last of the instalments due, that the appliance is practically worn out, or nearly so; and, neglectful of the maxim that a stitch in time saves nine, he is apt to let it get into a state of bad or indifferent repair.

Recent Patent Issues.

Prepared for the American Gas Light Journal by Royal E. Burnham, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.

1,008,334. Regulator for Gas Works. G. C. Hicks, Jr., Connersville, Ind.

1,008,448. Process of Making Gas. H. L. Doherty, New York City.

1,008,449. Process for Regulating Pressure in Gas Producing Apparatus. H. L. Doherty, New York City.

1,008,480. Gas Producer. N. Latta, Corlis, Wis.

1,008,494. Automatic Poker for Gas Producers. W. F. Rust, Youngstown, O.

1,008,741. Gas Burner. A. G. Sherman, Detroit, Mich.

1,008,833. Gas Producer. A. M. Levin, Chicago, Ills.

Items of Interest
FROM VARIOUS LOCALITIES.

Last week we announced that Mr. M. J. Loxley, of Philadelphia, Pa., had become associated with the banking house of Graham & Co., whose headquarters are in 435 Chestnut street, that city. In this connection it may be of interest to note that Mr. Loxley has been identified with the gas business since 1903. One of his noteworthy dealings was the sale of the Richmond, Ind., gas property to Messrs. Bertron & Storrs. He was also connected with the transfer of the South Bend (Ind.) Fuel and Gas Company to the Bertron and Storrs combination, and further figured in the re-selling of same to Mr. C. H. Geist, of Philadelphia, in 1907. Mr. Loxley is a man of no mean ability, which happy trait is well reinforced by sturdy reliability. We wish for him every success in his new connection.

The Public Service Commission, Second New York District, has authorized the Rochester Railway and Light Company to issue its consolidated, 5 per cent., 50-year gold, mortgage bonds, dated July, 1904, to July 1, 1954, to the aggregate amount of $1,998,000. The bonds are to be issued in exchange, par for par, for Rochester Gas and Electric Company's 5 per cent., 20-year gold bonds, issued under a mortgage dated November 1, 1892, and due November 1, 1912, as such last mentioned bonds can be acquired by the Company.

In the Journal for the 13th inst. (page 319), we reported that the Stacey Mfg. Company, of Cincinnati, had been awarded a contract for the construction of a 200,000 storage holder for the Charlottesville (Va.) Municipal Gas Works. This was in error, our informant basing the mention on the fact that the committee favored the Stacey proposition, but the Mayor and his cabinet, believing that the city would be better served by accepting the proposal submitted by the Kerr Murray Mfg. Company, of Fort Wayne, have accordingly been authorized to construct at the named point, a holder up to retaining 100,000 cubic feet.

"B. W.," writing from Rochester, N. H., under date of the 14th inst., says: "I presume you have been informed of this move, but I send it on, in any event. On the 1st of January, 1912, a new selling schedule becomes effective. Under it the net rate for gas will be $1.50 per 1,000, and the rate for electric current will be 14 instead of 15 cents per kilowatt hour."

The building authorities of St. Louis have issued a permit to the proprietors of the Laclede Gas Light Company, under which they will construct a modern office building on the site, 1015 to 1021 Olive street. It is to be 10 stories high, and the estimated cost thereof is $500,000. The architects are Messrs. Mauran, Russell and Crowell, and the contractors are Messrs. James Stewart & Co.

The hooking-up of the gas mains of Stoneham, Mass., with the mains of the Malden and Melrose (Mass.) Gas Light Company, has been completed, and the people are quite satisfied, in fact pleased, with the changed conditions.

Recent advices from Spring Lake, N. J., are to the effect that the Coast Gas Company, of Belmar, N. J., has arranged for the placing of mains in the streets of Wall township leading from the Manasquan turnpike at Sea Girt to Allenwood, and on to the Ocean County line. The Company propose to supply Lakewood with gas through this main, which will take off directly from the Belmar plant. It is also proposed to supply the residents along the entire line, provided the township authorities agree.

Mr. Joseph B. McCall, President of the Philadelphia Electric Company, has accepted an invitation to address the Philadelphia City Club on the matter of "Supplying Philadelphia with Electricity for Light and Power." The time selected is the evening of the 9th prox., and the lecture room will be the audience hall of the City Club.

The National Gas Improvement Company, of the United States, has been incorporated in New York by Messrs. C. P. Lenk and George Turnbull, of New York city, and Henry P. Morris, of Cranford, N. J. It is capitalized in $25,000.

"Tuomey," writing from New Brunswick, N. J., under date of the 17th inst., forwards the following: "One who has been in the gas

business continuously and actively, say, for the past 25 years, would hardly consider it likely even that a Gas Company should contest a claim for damages on account of injuries to shade trees or greenhouse contents, or the like, caused by gas escaping from street mains. In the last 34 years I have been cognizant of 68 cases of this sort, and in every instance (save 3 which had exceptional features) a verdict against the gas suppliers was reached. Settle, I would say, even when the burden of proof seems decidedly against the complainant. Better terms will undoubtedly be gained by so doing. Here is the last one I know of that has been fought to a finality, as per special press despatches from Trenton, dated the 14th inst.:

"Finding no error in the trial the Supreme Court of New Jersey affirmed a verdict for damages obtained in the Camden Circuit by Mary G. Nevin against the Public Service Gas Company. The action was based upon the destruction of 5 shade trees, planted immediately inside the curb line of a public street, which were destroyed by illuminating gas escaping from defendant's mains in the street. At the conclusion of the trial the Company asked for a non-suit upon several grounds. One was that the plaintiff had failed to show the ownership of the trees or title to the lands on which they were standing. The court held that this ground was without merit. A second reason urged for the nonsuit was that the Company's negligence had not been shown. In disposing of this phase of the case the court said: 'A sewer had recently been constructed which was likely to cause a depression in the gas main, perhaps resulting in a leak. There had been an odor of gas in front of the plaintiff's premises for some 6 weeks before any repairs had been made, and there was also some evidence of a lack of inspection, and a delay to repair after actual notice had been served upon the Company that there was a leak. Vegetation in and about the trees had died, ocular proof that there might be an escape of gas. It is clear, therefore, that a jury question was thus presented, and that in view of the facts thus adduced a direction to find for the defendant would have been improper. Error is assigned upon the admission of testimony with reference to the destruction of grass, trees and other vegetation in close proximity. This was clearly admissible as a circumstance calculated to put the defendant upon its guard against an imperfet main, and to give cause for a particular inspection to ascertain if escaping gas was causing the death of the vegetation. There is, therefore, no error in its admission.'"

ADVICES from Escanaba, Mich., dated the 18th inst., are to the effect that the new municipal gas plant, which was planned by Mr. W. J. McCorkindale and constructed by Mr. F. W. Freese, was tested out a day or so before, and our authority declares, "Exhaustive tests proved beyond any reasonable doubt that * * * the plant is entirely satisfactory, and that it may be relied on to give efficient service and deliver a product that will be as acceptable to the housewife in her daily work as it is to the technical expert in gas manufacturing."

"B. S. R.," writing from Grand Rapids, Mich., under date of the 16th inst., says that Messrs. Kelsey, Brewer & Co., have purchased the Boise (Idaho) Gas Light Company, and the new owners propose to improve the system in all its parts. The purchasers are arranging for an issue of $300,000, first mortgage, 30-year, 5 per cent. gold bonds, quite a percentage of the funds so raised to go towards putting the plant in first-class shape. Boise is growing at a wonderful rate, and now harbors 25,000 people, although 10 years ago the number certainly did not exceed 12,000. The plant was built in 1903.

MR. L. N. BOYSON, of Chicago, has renewed his application to the authorities of De Pere, Wis., for the right to there construct and operate a gas plant.

THE Detroit *Free Press*, in a recent issue, declares that the proposition to light the streets of Mt. Clemens, Mich., with gas, has received a decided impetus with the information that the Ways and Means Committee of the Council is outspoken over the suggestion to give the plan a thorough trial. There can be no doubt about it that there has been great dissatisfaction recently in the Mount over the way in which the lighting has been performed, and many are positive in expressing their desire that the contract on this account with the Edison Company when the same expires be not renewed. The Mt. Clemens Gas Light Company has made the city an offer to demonstrate along Cass avenue what can be done by means of gas arc lamps. The details of the trial scheme have not been worked out, but the demonstration is to be on a large scale, and it will be carried out at the expense of the Gas Company.

THE Semet-Solvay Company, of Syracuse, N. Y., has been awarded the contract for the construction of a new gas generating plant for the North Shore Consolidated Gas Company, Waukegan, Ills.

AT the annual meeting of the stockholders of the Brooklyn (N. Y.) Union Gas Company, no change was made in the Board of Directors, as follows: William Rockefeller, David G. Leggett, Elverton R. Chapman, Henry W. Cannon, William G. Rockefeller, H. H. Rogers and James H. Jourdan.

THE Consolidated Gas, Electric Light and Power Company, of Baltimore, Md., held its annual meeting in Jersey City, N. J., last Wednesday. It was a satisfactory session for those interested, in that earnings for the 4 months of the new fiscal year, which began July 1, 1911, showed a material increase over the corresponding period of the previous year. Best of all, this gain in income is shown to be due to new business secured by the Company in the first 4 months of the new year. The report issued a few weeks ago covering the fiscal year ended June 30, 1911, proved that 5,472 new meters had been set in the 12 months, or an increase of 5.7 per cent. over the previous year. And it is also shown that the increase in the 4 months of the new fiscal year of 1912 has been in proportion to the gain reported for the previous year. In that connection it is also worthy of note that the business on new account gained by the Company is not traceable to the arrival of newcomers in Baltimore, but to the efficient campaign work for additional consumers which the Company's solicitors have performed. The gains in new consumers figure in both the gas and electric departments.

A CORRESPONDENT in Ottawa, Canada, forwards the following: The annual report of the Department of Inland Revenue, Canadian Government, in regard to the inspection of gas and electric supply in the Dominion, shows a satisfaetory state of affairs as concerns the general observance of the candle power standard for gas. Over 1,000 tests were made in 38 cities, and in only 9 cities and 18 instances—outside of Winnipeg and Vancouver—was the gas found below the standard at any time. The city of Montreal is given a clean sheet in this report; 105 tests were made during the year, but not in one case was the gas found below the standard. The highest candle power which Montreal gas showed at any time was 18.21 in June. In April and December the standard (16) was just reached. The one instance in which Toronto was tested below standard was in November a year ago, when in 1 case out of 8 tests it fell to 15.98; the highest for the same month was 16.66. The highest point reached during the year was 20.10-candle power. The average illuminating power in Montreal was 16.87 candles, and in Toronto it was 17.28. Thirty-five grains of sulphur and 4 grains of ammonia are allowed per 100 cubic feet; but sulphuretted hydrogen is prohibited. No ammonia or sulphuretted hydrogen was found in the gas in Montreal. The presence of sulphur did not rise above 4.37 grains, while 35 grains are allowed. At Toronto no sulphuretted hydrogen was discovered, though 104 tests were made during the year. The tests for sulphur and ammonia cover only 4 months. In these months the presence of sulphur showed as high as 14.04 grains, but of ammonia as high only as one-fifth of a grain. So it would appear that, while Toronto gas shows a higher illuminating power on the average, the Montreal article is purer than that produced in the Queen City. It is interesting to learn that out of 55,390 gas meters submitted for verification during the year only 423 were rejected. Of these 58 were unsound; 257 were fast—that is, they favored the Company; and 108 were slow. In Montreal only 90 were rejected out of 13,441; of those rejected 39 were unsound, 14 fast and only 37 slow. During the year 65,116 electric meters were tested and 94 rejected, of which 31 were unsound, 31 fast and 32 slow. The same report gives the number of lamps in use March 31, 1911, by every registered electric company in the Dominion. For the 5 companies operating in Montreal and its suburbs the figures are as follows:

	Arc.	Incandescent.
Montreal Light, Heat and Power Co.	2,259	538,936
Westmount Corporation	186	32,000
Lachine Corporation	80	3,500
Saaguenay Electric Water Co.	..	10,000
Central Heat, Light and Power Co.	25	7,600

MR. W. A. EVERSON, Receiver of the Hamilton (Can.) Gas and Electric Company, reports that the liabilities of the Corporation are in excess of $1,000,000, and that the assets are about 50 per cent. of the liabilities.

MR. R. J. MCCUEN, Superintendent of the Baltimore (Md.) Public Lighting Department, is considering a scheme for the bettering of the street lighting in that city.

The Market for Gas Securities.

Consolidated remained in the strong list for the week, and the transactions were numerous. Here it might be remarked that the trading was marked by the appearance of an investor who, to the knowledge of the writer, has not bought a share of the stock since 1907. He reappeared as a buyer, and took over several lots in excess of 100 shares per certificate. The opening in the shares to-day (Friday) was 142 to 142½.

The outlook in Brooklyn Union is seemingly not to the liking of the buyer for a rise, the disinclination to accept anything other than aggressive measures for a stock increase being liable for the disappointment. An extra of 1 per cent., and the surety that each quarter will witness at least a similar disbursement until all arrears on dividend account have been made up, would seem pretty good to us. Then, too, is the surety that an increase in capital, even though the same had to be purchased at par, with the more than probability that the dividend rate will shortly go to 8 per cent., should put the value of the shares at least to 200. Lacledes are strong, as also is Peoples, of Chicago. The latter seems to have the better of the argument with the city authorities over the rate contest.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

NOVEMBER 27.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$73,177,000	100	142	142¼
Central Union Gas Co. — 1st 5's, due 1972, J. & J.	8,000,000	1,000	103	105
Equitable Gas Light Co.— Con. 5's, due 1932, M. & S.	1,000,000	1,000	115	118
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.— 1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River— 1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	95	100
Northern Union— 1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	50	70
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	143½	146
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	200,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	¼	¾
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	59	60
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,000,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	20,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,662,750	100	90½	91
Preferred	3,036,500	100	75¼	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	13,460,084	—	—	—
Mortgages, 5's	3,400,000	—	—	—
General Mortgage 4½	10,061,000	—	—	—
Con. Gas Co., Baltimore City, 4½	2,751,009	—	—	—
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	978,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	3,500,000	—	102	105
Detroit City Gas Co.	6,580,000	—	—	50
" Prior Lien 5's	5,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	106	106¾
Indianapolis	2,000,000	—	78	83
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	92	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	96
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis	10,000,000	100	105	106
Preferred	2,500,000	100	114	120
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,370,000	50	143	145
Madison Gas and Electric Co. " 1st Mtg. 6's	400,000	1,000	106	108¾
Massachusetts Gas Companies, of Boston	25,000,000	100	91½	91⅝
Preferred	25,000,000	100	95¾	96
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	105¼	105¾
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.— 1st Mtg. 5's	1,000,000	1,000	100	102
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	106
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	3,447,000	1,000	97	98
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,600,000	200	430	440
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	289	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October, ——, 1912. Atlantic City, N. J. Officers: President, Ira C. Copley, Aurora, Ills. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting, ———— Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Next meeting, Syracuse, N. Y., Nov. 1911. Officers: President, R. M. Searle, Rochester, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street, New York City.

Guild of Gas Managers of New England.—Annual meeting, March, 1912. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, time, March, 1912, Chicago, Ills. Officers: President, C. B. Strohn, Elgin, Ills.; Secretary-Treasurer, F. E. Newberry, Dixon, Ills.

Illuminating Engineering Society.—Annual meeting, Sept. ————1912, ———— Meetings of Sections, monthly. Pres't, A. E. Kennelly, Boston, Mass.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York, Secretary, Albert J. Marshall, 16 East 40th street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, A. L. Eustice, 105 North Wabash avenue.

Indiana Gas Association.—Annual meeting, Jan. 17 and 18, 1912, Indianapolis. Officers: President, S. E. Mulholland, Fort Wayne; Vice-President, Howard L. Olds, Indianapolis; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, time, May, ——, 1912; Lincoln, Neb. Officers: President, G. W. Clabaugh, Omaha, Neb.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, Sept. 1912. Manhattan, Kas. Officers: President, B. F. Eyer, Manhattan, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association.—Annual meeting, time, Sept. ————1912;———— Officers: President, F. W. Blowers, Kalamazoo, Mich; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1912; St. Louis, Mo. Officers: President, F. E. Murray, Louisiana, Mo.; Secretary and Treasurer, N. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, December, 1912. Atlanta, Ga. Officers: President, C. L. Holman, St. Louis, Mo.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May, 1912, Kansas City, Mo.; Officers: President, A. B. Macbeth, Independence, Kas. Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, third Wednesday in February, 1912 Boston. Officers: President, J. A. Coffin, Gloucester, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—President, William H. Pettes, Newark, N. J.; Secretary-Treasurer, Arthur H. Osborn, Belmar, N. J.

Ohio Gas Association.—Annual meeting, February 6 and 7, 1912, Columbus, O.; President, John M. Garard, Columbus, O.; Secretary-Treasurer, T. C. Jones, Delaware, O.

Oklahoma Gas, Electric and Railway Association.—President, Noel R. Gascho, Alva Okla.; Secretary, H. V. Bozell, Norman, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. ————1912, ———— —Officers: President, W. Baurhyte, Los Angeles, Cal.; Vice-President, Henry E. Adams, Stockton, Cal.; Secretary-Treasurer, John A. Britton, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1912, Williamsport, Pa. Officers, President, C. W. Butterworth, Millon, Pa.; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1911; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 254 West 39th street, New York city.

Southern Gas Association.—Annual meeting, April, 1912, Jacksonville, Fla. Officers, President, H. B. Hoyt, Jacksonville, Fla.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. April 27, 28, 29, 1912; Houston, Tex. Officers: President, J. E. Carroll, Beaumont, Tex.; Secretary, D. G. Fisher, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 15 and 16, 1912, Milwaukee, Wis. Officers: President, H. M. Buck, Waukesha, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.